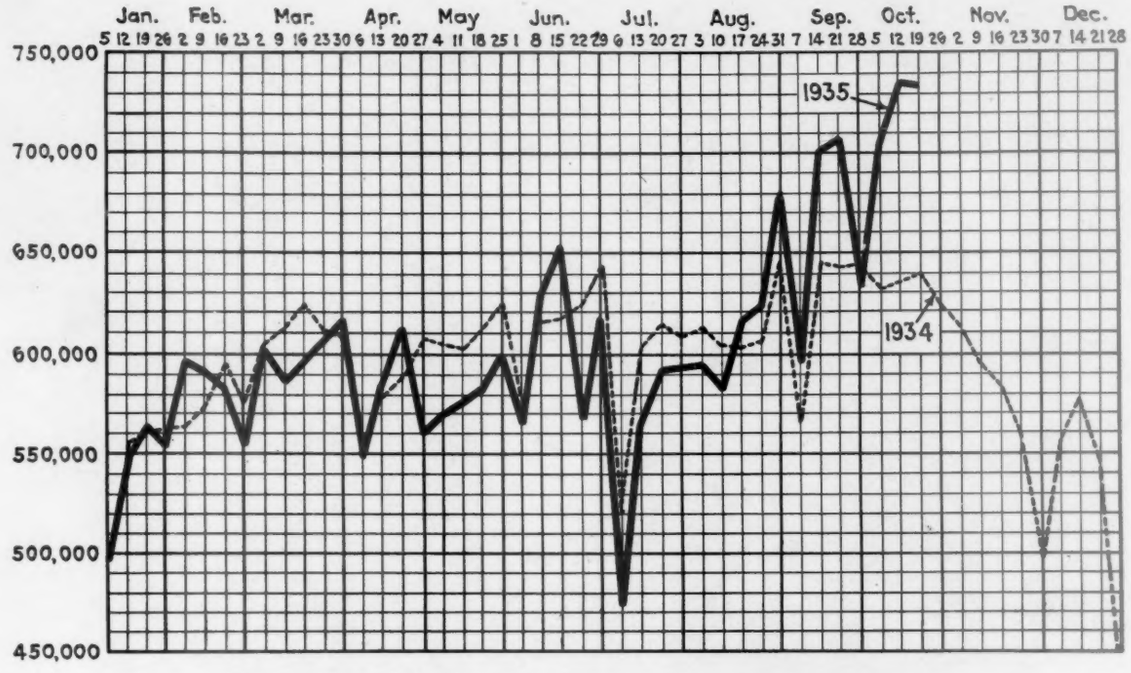
NOVEMBER 2, 1935

Railway Age

FOUNDED IN 1856



Carloadings this fall have greatly exceeded 1934 level

Traffic, Earnings and Purchases

INCREASED traffic is essential for increased earnings. Increased earnings are essential for increased purchases. Consequently, the big increase in traffic and earnings this fall should be a strong factor in encouraging many roads to purchase much needed equipment and materials. And modern equipment that cuts operating costs will enable the railroads to handle increased traffic better and more efficiently, and have a greater margin of earnings applied to net operating income.

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Railway Age

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In This Issue

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

A GREATER REPUBLIC STEEL CORPORATION

accepts the challenge of industry . . .

With assets increased by more than $40,000,000, with greatly enlarged reserves of northern iron ores, with advantageous terminal facilities on the Great Lakes and strategically located additional plants, a greater Republic Steel Corporation accepts the challenge of every steel-using industry.

The merger of Corrigan-McKinney Steel Company and Newton Steel Company with Republic Steel Corporation is one of far-reaching significance. Corrigan-McKinney Steel Company brings to Republic tremendously increased facilities for the production of high grade pig iron and steel. Newton Steel Company has long been an important source of supply for quality sheets.

Even before the acquisition of these companies, Republic was the world's largest producer of alloy steels, including the famous Agathon line, ENDURO perfected stainless steels and the new Republic Double Strength high tensile steels that are lightening the weight of nearly every type of transportation unit. Republic has been the sole maker of rust-resisting Toncan Iron for more than 27 years—the pioneer in the development of electric resistance welded pipe—the maker of Sil-con low-loss electrical sheets and coiled strip.

In addition to making these trade-marked products, Republic continues to occupy an important place among the producers of high quality plain carbon steels in practically all commercial shapes.

A greater Republic Steel Corporation accepts the challenge of industry —looks optimistically to the future—keeps pace with the increasing demand for ever better steels—steels lighter in weight—steels of greater strength—steels more resistant to corrosion and high temperatures—steels that strike a new note in beauty—steels more dependable, longer lasting and more economical.

Republic Steel
CORPORATION
GENERAL OFFICES · · · YOUNGSTOWN, OHIO

ALLOY AND CARBON STEELS
TONCAN IRON • STAINLESS STEEL
PIPE AND TUBULAR PRODUCTS
BARS AND SHAPES • PLATES
HOT AND COLD ROLLED STRIP
HOT ROLLED, COLD ROLLED
AND SPECIAL FINISH SHEETS
TIN PLATE • WIRE PRODUCTS
NUTS, BOLTS, RIVETS, ETC.
DIE ROLLED PRODUCTS

RAILWAY AGE

The "Forgotten Industries"

The forgotten industries of the United States will meet in Chicago next week. The Association of American Railroads will meet on November 7 and 8. The Railway Business Association, composed of manufacturers for railways, will meet and have its big annual dinner on November 7.

These are large industries. Their condition and prospects formerly attracted attention. In 1929 they directly and indirectly gave employment to about 2,700,000 men, of whom at least 1,400,000 are now out of work. They are in the worst condition now of any industries, but they and their employees are so forgotten that nobody excepting themselves cares much about it. The railways are bleeding to death. The New Haven having recently applied for trusteeship, railways operating 69,211 miles of line, representing an investment of $5,045,016,795, and having outstanding $3,240,262,680 of funded debt and $1,838,434,448 of stock are now, by their own admission, bankrupt. This is 27 per cent of total railroad mileage, 19.5 per cent of investment, 22.2 per cent of funded debt and 18.2 per cent of stock. And numerous other railways are bankrupt without having admitted it. Never in history was there a railroad bankruptcy record that approached this.

The railways are drifting toward government ownership, the worst single political and economic calamity that could befall the United States. But neither New Dealers nor Old Dealers say much about it. Until recently the residential construction and railway equipment and supply manufacturing industries were suffering from the greatest losses of business of any industries. The residential construction industry is rapidly coming back. The railway equipment and supply manufacturing industry has had in 1935 the worst business of the depression excepting in 1932 and 1933.

Few Friends Among New Dealers or Old Dealers

The evidence that the railway and railway manufacturing industries are forgotten is conclusive. In the great controversy raging between the New Dealers and the Old Dealers they are hardly mentioned. The New Dealers have favored equalization of transportation regulation, but, at the same time, have followed policies that have restricted the increase of the traffic and greatly increased the operating expenses of the railways, as if it makes no difference what happens to them. The Old Dealers inveigh against government regimentation of other industries and government subsidization of competition with them, but regard with complacency, and actually advocate, the same policies for the railways. Most Old Dealers, like many New Dealers, have been infected by the anti-railway propaganda of automotive and waterway interests, and when they happen to say anything about the railways it is superciliously to assert they have been unprogressive and have been financed and managed without initiative, ability or foresight. Hence what does it matter what happens to them?

And how about the railway equipment and supply manufacturing industry? A large part of the entire manufacturing industry of the country produces—or did produce—exclusively or largely for the railways. It has designed and developed most of the equipment and facilities that the railways use. An indictment of the railways for lack of initiative, efficiency and foresight is therefore also an indictment of the manufacturers for railways. Whatever hurts the railways and their employees also hurts those who manufacture for the railways. But neither the New Dealers nor the Old Dealers seem to care anything about that. They don't seem to know there is any industry that manufactures for railways, or that it makes any difference to the nation whether that industry does $1,500,000,000 of business in a year or only a fourth or a fifth of the amount!

Transportation Problem Not a Political Issue

When the executives of the railways and of companies that manufacture for them meet in Chicago next week, they might well consider why theirs are forgotten industries. Why have they apparently no real friends among either the New Dealers or the Old Dealers? The New Dealers have them right under their thumb where they can exert the full regulating, taxing and subsidizing powers of a government "planned economy" to aid or annihilate them. Why, then, are not the New Dealers strong for them? Why don't they hold them up as fine examples of what their policies can accomplish for other industries? And, as the Old Dealers are opposed to such policies for other industries, why are they not opposed to them for the railways and those dependent upon them for business and employment? We sometimes hear the Old Dealers use the railroad example to illustrate what the government can do, and should not do, to other industries. But we never hear them advocate a complete discontinuance for the railways of the same policies which they claim would ruin other industries. The railroad situation is both so important and so bad that it would seem the railroad problem might become one of the principal issues between the New Dealers and the Old Dealers in the approaching national political campaign. There is no indication that it will. What-

ever their differences, the New Dealers and Old Dealers seem entirely satisfied to unite in ruining the railroads and the industries dependent upon them for a market and leaving many thousands of their employees on the relief rolls.

Why Other Industries Have Their "Place in the Sun"

Why do other industries have their places either in the New Deal sun or the Old Deal sun? It is because they openly, energetically and courageously fight for a place in the sun and raise so much hell that the politicians have to heed them. Nobody can forget the agricultural industry at present. It is fighting with all political weapons for the restrictions of production, subsidies and higher prices that it wants, and getting them regardless of all present and prospective consequences. Nobody can forget the public utility industry at present. It fought, and is still fighting, openly and in the last ditch against political efforts to ruin it. Its methods may not all have been nice; but they accomplished something, and a continuance of them will accomplish more. Nobody forgets the automotive industry. It is the best of all advertisers and salesmen, and, therefore, a tough competitor for the railways, which are not good advertisers and salesmen. The New Dealers failed to impose their will regarding collective bargaining with labor under NRA upon the automotive industry, because it virtually told them it would shut down its plants rather than be dictated to by labor union organizers.

Why Should Not "Forgotten Industries" Fight?

The railways and the industry that manufactures for them are in their present condition principally because of fear—fear to speak out and fight for their rights and interests. The principal reason why the railroad bankruptcy record recently has been shattered is that the railways have restored and are now paying the highest wages in history—wages much higher than those being paid for comparable work in other industries—when their payment has been and is completely unjustified by transportation and economic conditions. Why do they do so? Because they fear a nationwide labor controversy might increase the number of railroad bankruptcies, and even result in their seizure by the government. Would that be any worse than to be bankrupted and slowly driven into government ownership, as they are being by present policies?

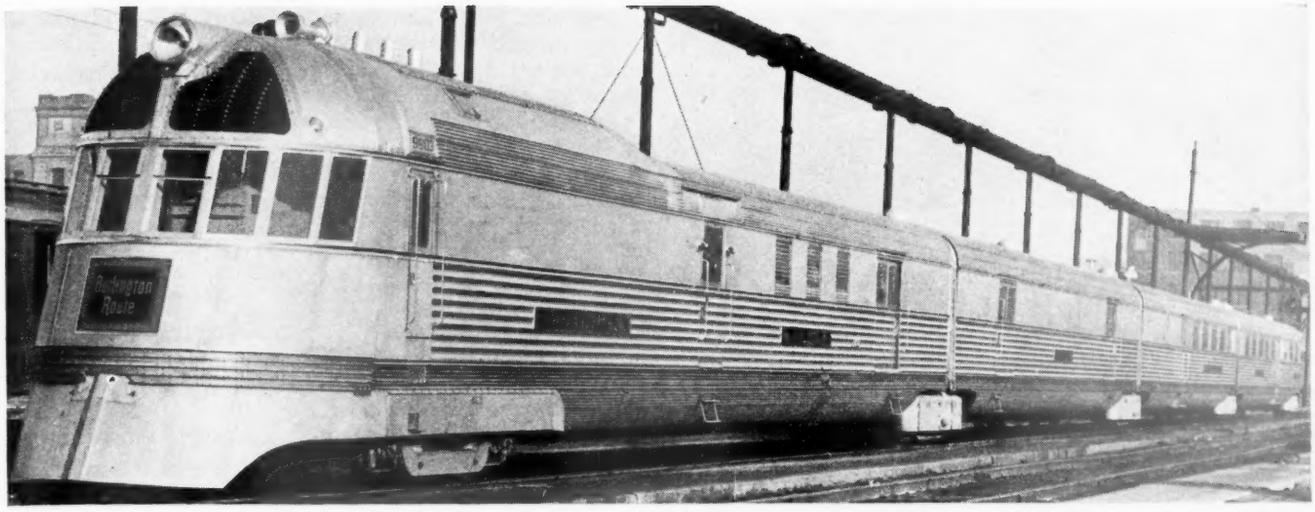
A nationwide railroad labor controversy, or even strike, at present would at least make the railroads no longer a forgotten industry. It would squarely put up to both New Dealers and Old Dealers the question whether they are going to continue to unite their efforts to ruin the railroads, or are going to unite to restore their earning and buying power, or are going to fight out between them whether there shall be continuance of policies leading directly toward government ownership. The railway manufacturing industry has the same interest as the railroads. It is being ruined by lack of railroad buying, which is due to lack of railroad net operating income. Why should not these two industries, when they meet in Chicago, agree upon a program that would remove them from the class of forgotten industries?

The help of employees of the railways and of the railway manufacturing industry would be needed in carrying out such a program. Railway employees and, especially labor leaders, would be antagonized by a movement for wage reductions. But many railway employees realize that their jobs are at stake. Many employees of railway manufacturers could be made to realize that their jobs also are at stake. Railway employees can't eat their cake and keep it. Their restored wages were in effect throughout April-September, inclusive, but the number of employees averaged 31,282 less than in the corresponding months of 1934. Those still on the pay roll are glad to get the higher wages. But how about the 698,898 who were on railroad pay rolls in these months of 1929 and not on them in 1935? How do they feel about New Deal and Old Deal policies and excessive wages that keep them unemployed?

Railroad employees and probably employees of manufacturers for railways can at least be lined up against Old Deal policies of transportation regulation and subsidization that destroy employment for them by destroying business for their employers. The political influence of railway employees was largely responsible for the recent passage by Congress of the act for regulation of carriers by highway. It will be used in behalf of passage of the Pettengill long-and-short haul bill at the next session of Congress. Both New Dealers and the Old Dealers might become more interested in the forgotten industries if they were made to feel concern regarding the attitude and policies of these industries and their employees during next year's national political campaign.

Vital Importance of the "Forgotten Industries"

The railways and the railway manufacturing industries are forgotten because they don't make enough efforts to force politicians, other industries and the people to remember that they exist and are of some importance in the scheme of things. They are of more vital importance now than ever before. Their revival is essential to recovery. Their revival is essential to preventing government ownership of railways, which would be the longest step that could be taken toward a socialistic planned economy for all industries. They are beginning to revive. Car loadings recently have largely increased and a continuance of their increase will result in an increase of railroad buying from manufacturers. But these industries cannot afford to continue to drift along as forgotten industries and unresisting victims of both Old Dealers and New Dealers. They will never fully recover their rightful place in the sun without making a fight for it—and they are not making a fight for it now.



The Burlington's New Four-Car "Mark Twain" Zephyr

"Mark Twain" Zephyr Placed in Service

Burlington's fourth lightweight Diesel-electric train dedicated in colorful ceremonies at Hannibal, Mo.

AS announced in a news item in the *Railway Age* of October 5, the "Mark Twain" Zephyr was delivered to the Chicago, Burlington & Quincy at Chicago, October 12, made various exhibition runs during the subsequent week, was formally christened at Hannibal, Mo., October 25, with appropriate ceremonies, and placed in regular daily service between St. Louis, Mo., and Burlington, Iowa, beginning October 28. On October 23, an informal speed test of this train was made, during which it is reported to have operated at 122 m.p.h. for a distance of three miles between McCook, Nebr., and Oxford.

The test run was made over a new right-of-way which replaced a considerable stretch of track washed away by floods of the Republican River last May. The present road was elevated above bottom lands along many sections and in others it was moved back close to the hills which border the river to avoid danger of future floods. These improvements, which were completed only a short time ago at a cost of about $3,000,000, are said to have made the present track comparable with the best in America and capable of carrying trains safely at speeds up to 150 m.p.h.

The "Mark Twain" Zephyr is a four-car train, but for the purposes of exhibition runs and the speed test mentioned, the baggage-carrying car was temporarily removed from the train. The Electro-Motive 600-hp. Diesel-electric power plant therefore was furnishing motive power for a three-car train weighing about 240,000 lb. The record speed claimed was made on a stretch of practically tangent track, eastbound between McCook and Oxford, Nebr., with a downgrade varying between .10 and .30 per cent. The passing time, mileage and average speed between stations are shown

Streamlined Rear End of the "Mark Twain" Zephyr Carrying a Bronze Plaque of the Famous Humorist and a Reproduction of his Signature

in the table. Station passing times were taken with a stop watch by an observer on the train, and maximum speeds observed from readings of the speedometer in the cab. Passing a mile-post marked "Edison", slightly over a mile west of the Edison depot, the Zephyr is reported to have attained a speed of 121 m.p.h. which was maintained for three miles, the speed then being increased to 122 m.p.h. which was held for an additional distance of three miles until the train began slowing down for the Oxford yards; in other words, about one mile before reaching the Oxford depot.

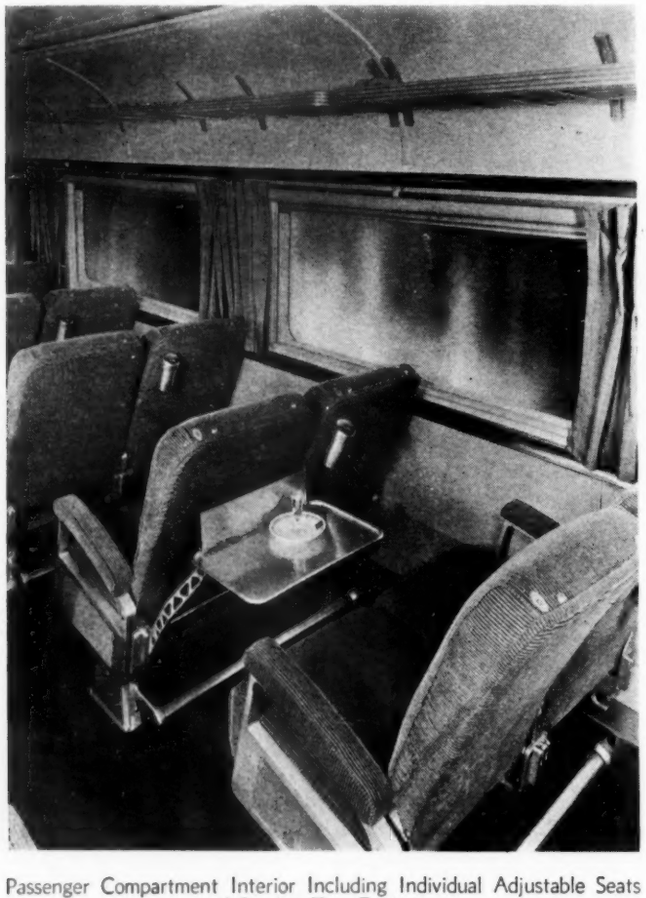
Speed Record of the "Mark Twain" between McCook, Nebr., and Oxford

	Time, central standard	Miles from previous station	Average speed, miles per hour
Left McCook, Nebr.	1:07:30 p.m.		
Passed Red Willow	1:13:05 p.m.	6.39	68.7
Passed Indianola	1:16:34 p.m.	4.34	76.9
Passed Bartley	1:21:14 p.m.	5.92	76.1
Passed Cambridge	1:27:07 p.m.	7.81	79.7
Passed Holbrook	1:34:07 p.m.	8.31	71.3
Passed Araphoe	1:38:22 p.m.	5.68	80.2
Passed Edison	1:42:24 p.m.	6.78	100.1
Arrived Oxford	1:46:30 p.m.	7.8	114.0*

* Maximum speed attained for a distance of three miles between Edison and Oxford, 122 m.p.h.

Description of the Train

The new Zephyr, built of stainless steel by the Edward G. Budd Manufacturing Company, Philadelphia, is the fourth lightweight Diesel-electric train purchased by the Burlington. It consists of four cars carried on five trucks, being approximately 280 ft. long and weighing about 287,000 lb. when supplied with fuel, water and sand, ready for operation. The train has a total seating capacity of 92 persons.



Passenger Compartment Interior Including Individual Adjustable Seats and Serving Tray Equipment

In addition to the power compartment, the first car of the train contains a 30-ft. convertible railway mail service compartment and a 15-ft. compartment for storage mail. The second car consists entirely of a 64-ft. baggage compartment. The third car includes a kitchen compartment for dining car service, a 16-passenger dinnette section, and a 20-passenger coach compartment with men's and women's lavatories. The fourth car contains a 40-passenger coach compartment, toilet accommodations for men and women and ample luggage and equipment locker space in addition to the 16-passenger lounge compartment. Spacious overhead racks extend throughout all the coach passenger compartments for storage of hand luggage.

The general construction of both the train and the power plant follows closely that embodied in previous Zephyrs, as described in the *Railway Age* of April 14, 1934, and April 20, 1935. The principal changes are in the provision of additional baggage space and a somewhat revised seating arrangement. Certain changes have also been made in the truck design, and the treads of all wheels except for the power truck are turned cylindrical. Improvements in the heating and air conditioning system include the provision of a Clarkson coil-type boiler, furnished by the Vapor Car Heating Company, and designed especially for use in lightweight trains.

Truck Design

The five trucks are of outside bearing type construction with various refinements in design to improve the riding qualities, reduce weight and promote quieter operation. They weigh 70,000 lb., exclusive of the gears and motors of the power truck, and all have cast-steel truck frames and bolsters which were furnished by the General Steel Castings Corporation. The power truck, carrying the weight of the power plant, has 36-in. wheels and hollow-bored axles. The trailer trucks are considerably lighter in construction and run on 30-in. wheels. All journals are fitted with Timken roller bearings.

Rubber composition inserts are used extensively in the trucks. There are inserts under the center plates, and the side bearings of trailer trucks, in both top and bottom equalizer spring seats and between the ends of the equalizers and journal boxes. At the sides of the center plates, on each trailer truck are strips of rubberized fabric belt material which take fore and aft thrusts and prevent metallic contact and transmission of sound; rubber thimbles are also provided around the king pin. Automotive brake lining is used wherever the members of the truck-brake rigging are likely to rub.

Helical-volute springs are used on the equalizers of the first truck only, equalizer springs on the other trucks being of the plain helical type. In order to dampen lateral oscillations at high speeds, Houdaille double-acting hydraulic railroad shock absorbers are installed between the bolster and truck tansoms on all trucks. Not only is the dampening a benefit in eliminating uncomfortable side sway, but the double-acting features of the shock absorbers also tend to prevent the bolster from striking if the train should enter upon a curve with a poor approach.

The distribution of the train weight is such that no two trucks are loaded alike. With the train ready for service, the power truck is estimated to carry a weight at the rails of 94,543 lb.; the first trailing truck, between the first and second car bodies, will carry 51,-

674 lb.; the second trailing truck, between the second and third truck bodies, 56,993 lb.; the third trailing truck, between the third and fourth car, 51,485 lb., while the truck at the rear end of the train will carry 32,550 lb.

The Heating System

Steam heating of the Vapor type is provided, with steam furnished by a Vapor-Clarkson oil-fired, coil-type boiler with an evaporating capacity of 500 to 600 lb. per hour. The boiler is normally operated at a pressure of about 85 lb., but is designed for a maximum working pressure of 200 lb. This boiler, located at the front end of the kitchen compartment in the third car, is much lighter than any boiler previously used in rail motor-car service, weighing only 1,000 lb. compared with 1,930 lb. for a vertical-tube type boiler of the same hourly capacity. Unusually rapid evaporation is secured by means of a forced circulation of water through tubes in which the water movement is "contra-flow" to that of the fire gases. The oil burner is of the pressure-atomizing type and the fuel pump is operated by the blower motor. Spark-plug ignition is provided.

The boiler is equipped with an entirely new type of control, the principal feature of which is a pressure switch designed to govern the amount of steam generated. This operates under rising steam pressure to reduce the oil burner from full flame successively to intermediate and low, which represents about 50 per cent of the full-flame evaporation. A further increase in pressure serves to shut down the oil burner completely until a sufficient drop in pressure causes it to cut in automatically. The speed of the triplex feedwater pump which provides forced circulation through the evaporator is also controlled through the pressure switch to keep the rate of water flow proportional to the evaporation.

A flow-operated by-pass prevents the fire from lighting or burning unless there is a flow of water through the evaporator coil. A steam-temperature control is provided to shut off the burner in case of low water when the steam temperature exceeds 480 deg. F. The water return from the separator passes through a heat exchanger on its way to the tank where much of its heat is transferred to the feedwater about to enter the evaporator coil of the boiler. The water flow is adjusted to the proper relation with the evaporation by a "trimmer" valve in the water pump by-pass, the correct setting being indicated by a temperature of 80 deg. in the heat exchanger when the burner is operating on full flame. If too much water is being pumped through the boiler or insufficient oil burned to maintain required steam temperatures, the separator connected with the boiler will fill with water and the boiler will prime. A stack-temperature switch functions to shut off the burner and water pump in case of failure of the flame.

Heat is supplied to the passenger compartments from fin-tube coils in the evaporator units of the air-conditioning system, the fresh and recirculated air passing through the units to the compartments. Steam is also supplied to a copper fin-pipe along the truss plank near the floor on each side of the compartment. The admission of steam to both radiators is controlled by a separate Vapor regulator and a magnet valve, the latter being actuated by a thermostat. The regulator reduces the steam from 85 lb. to atmospheric pressure and no high-pressure steam is used in the radiating pipes. Thermostats for the control of the air-cooling radiators are located in the recirculated air ducts. The thermostat for the side-wall radiators is placed near the floor and serves to bring these radiators into action automatically when the heat distribution from the air conditioning unit is not sufficient to maintain a pre-determined temperature at the floor.

During layover period, the entire train can be heated by steam from the terminal supply.

View of Control Equipment at the Operator's Station in the Front End of the Power Car

Air Conditioning

The three passenger compartments are completely air conditioned by the Frigidaire mechanical equipment. The compressor and condenser units are housed beneath the floor of two cars, while the evaporators and the distributing fans are built into the roof above the vestibules and bag locker space. This arrangement permits ready accessibility to the apparatus for repair and maintenance.

Fresh air is taken in through grilles in the dead light panels and is then passed through filters, where it is mixed with the re-circulated air in the proportion of about 1:4.

In each evaporator are located separate cooling and heating coils. The conditioned air is projected into a main duct which extends throughout the entire length of the passenger compartments between the light-duct coves. This air is distributed through hidden longitudinal openings between the lights in the coves. The air is returned through grilles at either side of the partitions at the ends of the compartment. Here, too, are located removable and washable air filters.

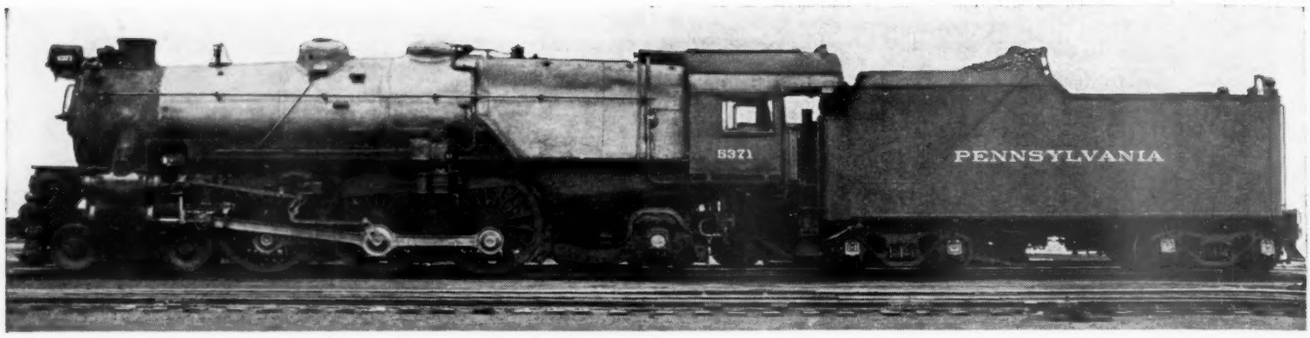
The capacity of the refrigerating system is 12½ tons per train, which is more than ample, thanks to the heat-reflecting properties of the bright, stainless steel exterior, and to the well insulated walls.

In moderately cold weather, the overhead coils will keep the compartments comfortably warm without side-wall radiation.

In order to supply stand-by service of the air conditioning from outside sources, a 220-volt, 60-cycle a.c. motor is used to drive the compressor and d.c. motor which then becomes a generator and charges the battery.

When the train is in operation, all power is supplied from the auxiliary generator with 77-volt direct current. The air-conditioning apparatus has been especially designed with a view to light weight and compactness. The entire equipment for the train weighs approximately 5,200 lb. complete.

All of the heating and air conditioning control devices are of the latest type furnished by the Vapor Car Heating Company, including a new design of regulator, having a constant-pressure feature with the diaphragm chamber located on the extreme end of the outlet, special openings being made in "hatch plates" in the floor of cars, so that the magnetic valves can be easily reached.



The Locomotive on Which the Roller-Bearing-Rod Installation Has Made 96,000 Miles in Passenger Service

Roller-Bearing Rods Pass Test Service

Pennsylvania Pacific type has made nearly 100,000 miles since rods of Timken design were applied

A COMPLETE installation of roller-bearing rods, designed by The Timken Roller Bearing Company, was placed in service on Pennsylvania Railroad locomotive No. 5371, a K-4-S Pacific type, on July 4, 1934. Since that time the locomotive has made 96,000 miles in regular passenger service, during which no trouble has been experienced with the crosshead or crank-pin bearings. The locomotive has been operating in regular passenger service between Pittsburgh, Pa., and Columbus, Ohio.

The bearing installation required a complete redesign of rods and crank pins which also included the crosshead, piston rod and piston head. High-tensile alloy steel as employed in the new design effected a material reduction in weight of the reciprocating parts and weights on the crank pin. At the same time this new design provides the close bearing tolerances required for successful roller-bearing performance combined with the flexibility of rod alignment necessary in locomotive service.

The table shows a comparison of the weights on the crank pins and the weights of reciprocating parts of the locomotive with its original rods and after it was equipped with Timken roller-bearing rods. It will be seen that, with the Timken rods, there is a total reduction of weights on all three crank pins of 88 lb., which includes a net reduction of 40 lb. in the weights of the crank pins themselves, a reduction in weight on the main crank pin of 240 lb., and a reduction in the weight of the reciprocating parts of 508 lb. At 100 m.p.h. this effects a reduction in total crank-pin load of approximately 48,500 lb. With an overbalance of 170 lb. in each driving wheel, as compared with the 286 lb. originally in each wheel, the Timken-equipped locomotive may be run up to 117 m.p.h. before its dynamic augment reaches

Rod and Bearing Weights of Pennsylvania Locomotive No. 5371

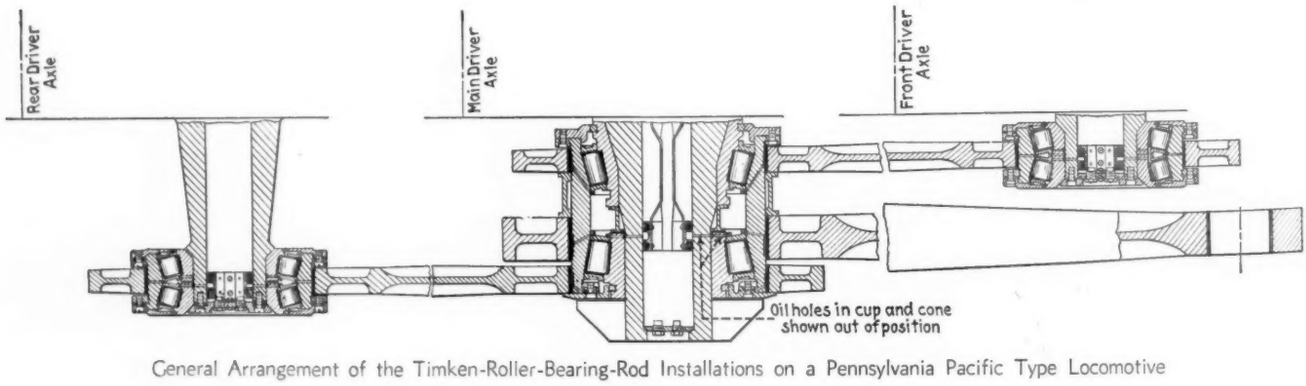
Weights on the Crank Pins, Lb.

With Roller-Bearing Rods

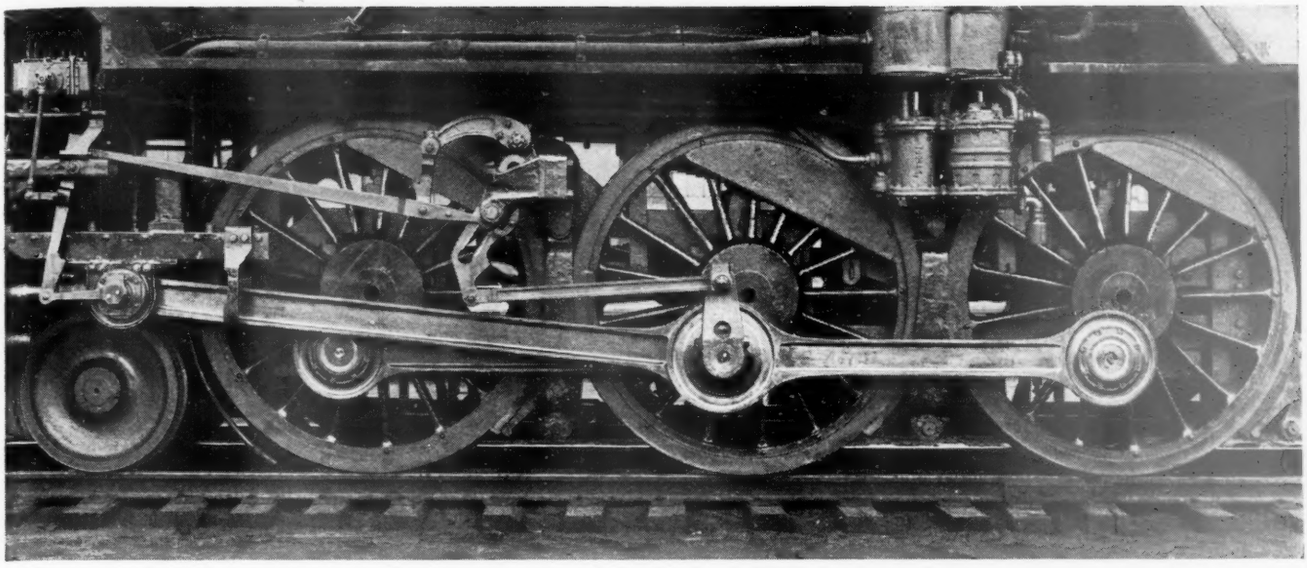
	Front	Main	Rear	Total all drivers
Weights fixed on pin	103	330	199	632
Weights revolving on pin	93	255	93	441
Rods	125	610	125	860
Total	321	1,195	417	1,933
With Plain-Bearing Rods				
Crank pins and parts (fixed)	97	282	97	476
Weight on pins (revolving)	188	1,153	204	1,545
Total	285	1,435	301	2,021

Reciprocating Parts

	Timken design	Plain bearings	Saving over P.R.R.
Total weight crosshead and parts	387	599	212
Piston and details	364	484	120
Main rod, front half	226	402	176
Total	977	1,485	508



General Arrangement of the Timken-Roller-Bearing-Rod Installations on a Pennsylvania Pacific Type Locomotive



A Closer View of the Running Gear

the value of that of the locomotive with the plain bearing rods at 90 m.p.h.

The outstanding features of the new design are: (1) The mounting of the roller bearings on the crank pins; (2) fitting of the rods to the bearings; (3) complete separation of the front and back sections of the side rods; (4) application of the main rod on the outer race of the main-pin bearing between the ends of the two side rods; (5) use of a crosshead having shoes pivoted around the crosshead pin, thus relieving the piston rod of eccentric loading from the guides. The piston, piston rod, the piston-rod key, crosshead forging, crosshead pin, main rod, side rods and crank pins are all of Timken High Dynamic steel, a chrome-nickel-molybdenum alloy heat treated to produce a yield point of 120,000 lb. and possessing high shock resisting qualities.

The Bearings

All bearings are fitted on the crank pins and not in the rods. On the main crank pin the bearing consists of two sets of rollers, each fitted in a separate cone. A portion of the inner cone and pin is tapered, ending in a 6¾ in. cylindrical fit toward the outer end of the cone. The cone at the outer end of the pin has cylindrical fit on the pin 6 in. in diameter. Around the pin taper between the two fits is a spacer between the bearing cones. Both sets of rollers are enclosed by a single cup or outer race.

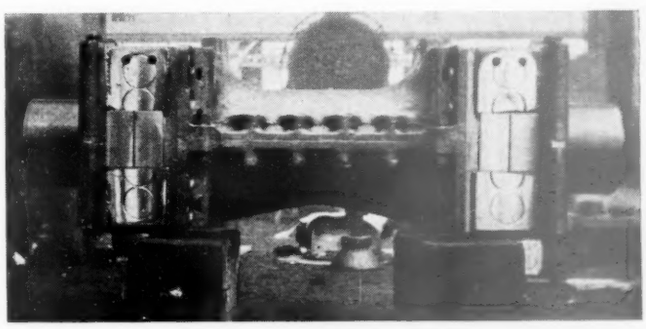
The eyes of the rods, which are specially forged I-sections, bear directly on the cup, which is 13½ in. in outside diameter. The rod bushings are of unusual design, each consisting of a ⅛-in. strip of hard rolled phosphor bronze, bent to shape, brazed, and pressed into the eye of the rod. A considerable reduction in rod weight is thus effected. The bores of the bushings are finished with a slight crown to provide the necessary freedom of angular movement of the rods on the bearing.

The front side rod is placed on the main pin bearing next to the wheel. Between this and the main rod is a light cylindrical spacer $3^{15}/_{16}$ in. wide. The back side rod is placed next to the main rod at the outer end of the bearing. A normal clearance of $^1/_{32}$ in. is provided between each pair of adjoining surfaces for lateral movement of the rods on the pin. This is somewhat increased on the side of the pin opposite the body of each rod by a slight taper in the width of the rod end to prevent cramping under angular movement of the rods with respect to their normal alignment at right angles to the center line of the crank pin. The overall length of the bearing cup is $10^{1}1/_{16}$ in. Side-rod bearings are each 1½ in. in length and the main-rod bearing 3 in. long.

The bearings on the front and back crank pins are made up of two sets of tapered rollers running in separate cones which are pressed on the 5-in. crank-pin fit. As in the case of the main crank pin, the bearing is completed by a single cup 11½ in. in outside diameter, on which bears the bronze-bushed eye of the side rod. The overall length of the bearing, including the end enclosures, is 4⅞ in.

Although differing in detail, all the bearings have the same type closure. This consists of a split retaining ring which, when in place around the cup of the bearing, bears against a lateral shoulder or flange on the cup. To this ring is secured, by wire-lock machine screws, the steel closure which moves with the cup. This is sealed by a phosphor-bronze retaining ring set in a groove in the bearing cone and fitting against the inner surface of the end closure. In all cases, except at the outer end of the main crank-pin bearing, the retaining rings fit around the outside of the cups. In the latter case the ring is fitted inside the cup and the closure member, by an extension of its outer diameter, forms the collar to retain the rods in position.

All crank pins are hollow bored, the main to a diameter of 3½ in. and the others to a diameter of 3 in. This bore, closed at the ends, forms a reservoir for lubricating oil and contains the device for metering the oil to the bearing. This consists of a short metal cylinder, in the



The Driving-Journal Bearing and Housing Mounted on the Axle

outer surface of which are grooves for felt rings and between these rings a circular cavity from which two passages 180 deg. apart, drilled through the crank-pin wall, lead to a small annular groove cut in the inner circumference of one of the bearing cones. From this annular passage two drilled holes, 180 deg. apart, but spaced 90 deg. from the holes through the crank pin, conduct the oil into the space about the rollers.

Holes drilled through the sides of the grooves in the cylinder within the pin bore give the oil access to the felt rings and permit it to feed through these rings into the cavity between them. The amount which feeds through the felt rings is determined by the hydraulic pressure to which they are subjected and this varies with the speed of rotation of the driving wheels. The feeding of the oil is thus automatically proportioned to the speed of the locomotive. As the oil enters the space about the rollers it is thrown to the inside of the cup by centrifugal force, where it accumulates about the rollers and overflows through passages in the cup which lead to the rod bearings. Thus, there are no oil holes in the rods. Rex fittings in the outer ends of the crank pins provide for the filling of the oil cavities inside the pins.

It is thus evident that the roller bearings float between the pins and the rods. In the case of the main pin, the bearing cup itself performs the double function of knuckle pin and crank pin in distributing the load from the main rod to the front and back drivers. The main crank pin itself is only subject to as much of the load as is transmitted to the main wheel. The length of the bearing on this pin has been determined by the necessity for locating the main rod according to present cylinder spacing rather than by the requirements of rod and pin design. Hence, the relatively large spacer between the front section of the side rod and the main rod and the $8\frac{27}{32}$ in. rear crank pin extension by which the bearing is separated from the face of the rear driving wheel.

The Timken Roller-Bearing Assembly on the Main Crank Pin

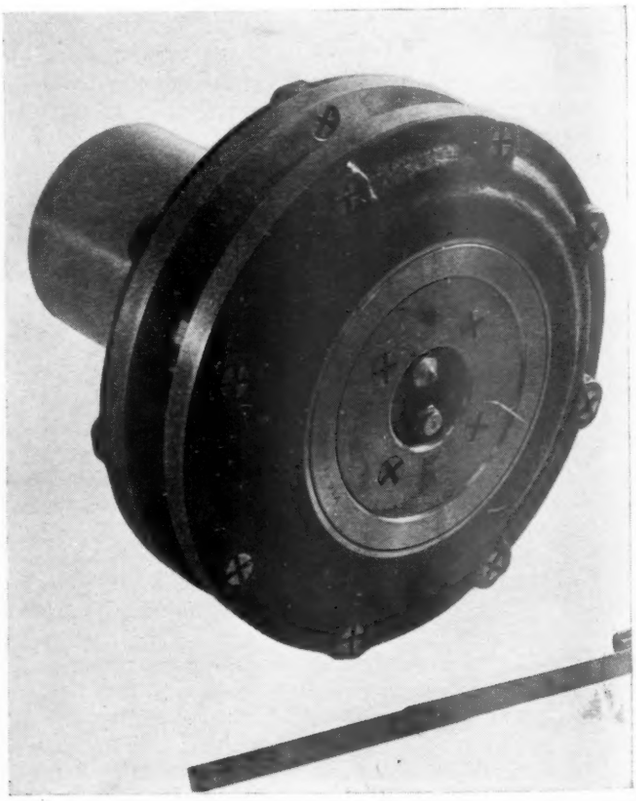
Rods

The rod design finally adopted was developed after an extensive study involving a long series of tests to determine the best distribution of metal to avoid high stress concentration. The form adopted is of I-section, tapering horizontally to relatively narrow bearings at the ends. The main rod, the body of which is $4\frac{3}{4}$ in. wide with $\frac{3}{8}$ in. web thickness, is tapered to a width of 3 in. at the bearing. The side rods are $2\frac{3}{4}$ in. wide with $\frac{1}{4}$-in. webs and taper to a width of $1\frac{1}{2}$ in. at the bearing. In the case of both side and main rods the metal about the bearings is formed in I-section by a process of drop forging developed to insure a smooth flow of metal about the bearing openings.

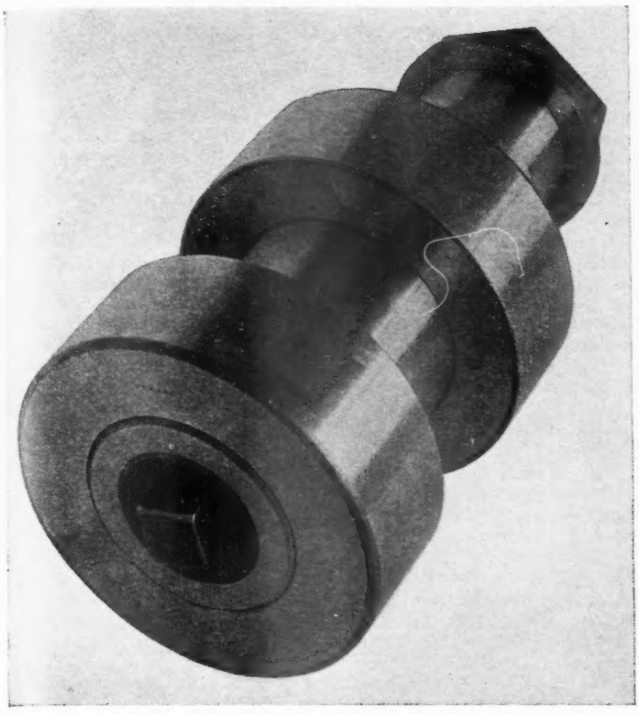
One of the most interesting parts of the installation is the crosshead. This consists essentially of three parts: the body, the pivot plates, and the shoe. The body of the crosshead is a forging, which serves to connect the piston rod with the wrist pin. Bosses about the wrist-pin opening on the sides of the crosshead serve as bearings for the pivot plates, which are free to rotate about them. Between the pivot plates is bolted the aluminum-alloy crosshead shoe design for the Pennsylvania type multi-wear guide. Thus, neither inertia forces from the crosshead shoe nor piston-head wear can produce bending moments in the piston rod.

The wrist pin is mounted in two specially designed Timken roller bearings, each consisting of a single set of rollers without retainers in a cone pressed in the crosshead. The inner race of the rollers is the wrist pin itself, which is pressed in the front end of the main rod. Like the crank pin, the wrist pin is hollow bored, to $2\frac{1}{2}$ in. diameter, and contains lubrication devices similar to those in the crank pin, one for each set of rollers. The inner end of the bearing is completely enclosed by a plate bolted to the crosshead. At the outer end where the end of the pin extends through for the union link a special rawhide seal is provided. The bushings of the pivot plates on the crossheads are $\frac{1}{8}$ in. bronze strips fabricated similarly to those in the side and main rods.

Both the piston and piston rod are forgings. The rod, which is forged from cold-drawn Timken seamless tubing, is 3 in. in inside diameter and $4\frac{1}{2}$ in. in outside

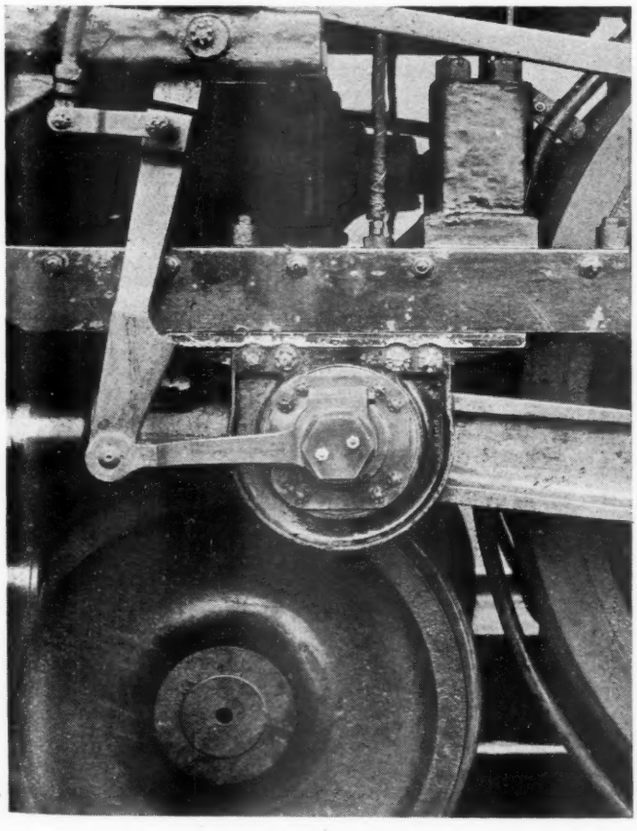


The Roller-Bearing Assembly on the Front and Rear Crank Pins



The Roller Bearings Mounted on the Crosshead Pin

diameter. The shape of the piston conforms to the standard for the engine class, except for a substantial reduction in section and weight. Because of the thinner sections and higher strength of the steel the piston deflects within its yield point 2.8 times as much as a carbon steel piston of axle grade within its yield point. This is the equivalent of two pints more in water entraining capacity per cylinder before rupture of the piston will occur.



The Crosshead, on Which the Shoe Is Pivoted

Indicative of the care with which the distribution of metal in the various parts has been studied is the crosshead key. At the edges where it bears against the ends of the keyway in the crosshead and the rod the key is 1⅜ in. wide. The body, however, is forged down to a web thickness of ⅜ in. except where it bears directly against the keyways. Here it is increased to ¾ in. to resist the shear. This key weighs 8½ lb.

Axle Bearings

Locomotive No. 5371 is completely equipped with roller-bearing axles. The engine truck is provided with the standard Timken engine truck boxes. The driving and trailer boxes, however, were designed to replace the plain-bearing boxes for which the locomotive was originally designed without major changes in the truck and frame construction.

In preparing the frame pedestals for the Timken driving boxes, the tapered sides of the pedestal jaws have been built up by welding, with wedge shaped fillers, and a hard bronze liner installed to provide a bearing face which is parallel to the shoe face of the jaw. This is also faced with a hard bronze liner. Like other Timken driving-axle installations, the bearings on each axle are mounted in a single box unit which, surrounding the axle, extends across the locomotive between the frames. Lateral movement of the axle and box unit is controlled by flanges inside the frame which bear against hardened steel facings welded to the inside of each pedestal leg. The bearing on each journal consists of two sets of Timken roller bearings. All axle journals are 10¾ in. in diameter. The pedestals are closed with the usual binders. The boxes are 17½ in. in width over the housing liners, and 1/64 in. total clearance is allowed between these liners and the frame shoes.

The trailer housing is designed to fit the trailer truck without change either in the pedestal or in the springs. The bearing has two sets of rollers pressed on to a journal diameter of 6½ in.

State Planning Boards See Surplus of Transport

WASHINGTON, D. C.

DANGER of an "oversupply" of transport facilities is seen by state planning organizations reporting to the National Resources Committee, according to a report released by the committee on October 29. The state groups are studying the possibility of eliminating duplicate facilities and consequent evils which "result in idle equipment, cut-throat competition, and ultimately, bankruptcy and unsatisfactory transportation service." Some states, however, desire additional railroad facilities.

The report on transport, a part of an extended report on state planning by the National Resources Committee, to be completed and made public within a few weeks, points out that "the more recently developed facilities have operated, in a large measure, as competitors of the earlier ones and developed from individual rather than a comprehensive point of view. The result has been a more or less unavoidable scrambling of transportation facilities."

Railroads have suffered from motor vehicle competition and from duplication, according to the report, and the Indiana State Planning Board finds that pipe lines,

with low operating costs, are also serious competitors, taking considerable traffic from the railroads. The board's report continues, saying "In the case of steam railroads, thousands of men and women are employed. Hundreds who were formerly employed in shops devoted to building, maintenance, and repair of tank cars and loading docks have been added to the unemployed as a result of pipe-line operation. The communities have lost the benefit of the distribution of wages." That this disadvantage may be offset to some degree by industrial benefits is indicated in the report of the Iowa board which recognizes the effect of pipe-line development, but points out that by promoting the development of Iowa manufacturing and other industries, pipe-lines may operate to increase both the amount and value per unit of weight of manufactured and other industrial and commercial products.

Need for Co-ordination Cited

Evidence of need for further progress in the field of co-ordinating all transport facilities is to be found in the reports of state planning organizations to the committee. Studies are presented of highways, motor vehicle traffic, port and water-way development, and airway transportation.

Aviation interest varies greatly among the states. New Mexico and Missouri report no special need for intrastate air routes. The Indiana board reports that in its opinion air transportation has not yet become a major factor in the transportation field. Other boards differ, California and Florida both finding intrastate aviation important, according to their reports.

Idaho, according to the report of its State Planning Board, makes all-around use of air lines in the state, where the major air-freight service is to mines, which might otherwise be required to shut down during the winter. The report continues, "Planes delivering 50-pound ingots of gold are no exception at the Boise Airport, nor is the flying of a 1,600-pound shaft to a mine, and landing it on the snow. The delivery of fuel oil has been accomplished in the same manner. The most important use of the air service during hot months has been the transporting of men and equipment to fight forest fires."

Summary of Report

A summary of the state reports includes the following:

The growth of transportation systems has taken place in a series of cyles. In the early stages of the development of the country, waterways were of prime importance. Traveling was slow at best, so that communities existed relatively independent of each other.

The steam railroad promoted the growth of large urban districts and made possible the establishment of such centers at a considerable distance from navigable waterways. But the real creation of the present-day metropolitan region started with the perfecting of electric railways and the gasoline-driven motor vehicle. At once the radius connected with a single main port or business center was enormously increased. In the place of communities 4 or 5 miles in diameter, large metropolitan districts have grown up whose radius of influence has extended to 20 miles, 30 miles, or even farther. The motor vehicle has made accessible the areas lying between rail transportation routes so that the various sections of a single state have become physically, as well as politically, part of a single unit for planning.

Transportation studies undertaken by State Planning Boards have taken into account not only the individual problems of these different forms of transportation within the state and as part of a national transportation system, but also the relation of transportation to other features of state development. They have considered the possibility of co-ordinating the different transportation elements into a unified system in which each will be used for the service it can most effectively perform.

The Committee on Highways and Transportation of the New York State Planning Board found that new facilities for rapid transportation over highways are changing the location of manufacturing plants; that the manufacturer's lighter raw materials, and parts of many of his products are being transported by highway vehicles, and that even his labor supply, in considerable part, comes to him by motor vehicles.

The Pennsylvania report exemplifies the general attitude when it states: "The co-ordination of transportation facilities implies the inclusion of * * * transportation agencies into a general system in which each type of carrier is on an equal basis with all other carriers so that, by united action, they may render more efficient service."

Today, adequate regulation can achieve many of the salutary effects attributed to competition. Many planning boards studied the possibility of eliminating duplicate facilities and preventing an oversupply of transportation facilities and consequent evils which result in idle equipment, cut-throat competition, and ultimately, bankruptcy and unsatisfactory transportation service.

Transportation studies in many fields have been undertaken by State Planning Boards. The Kansas board found a truck survey was essential to an intelligent approach to the problem of co-ordinating rail and highway traffic, and afterward, that the study was valuable to transportation agencies and to shippers. Other studies showed, in some cases, duplication of service between railroad lines and truck and bus routes, and in other cases very desirable complementary services. Connecticut transportation studies contained: (1) a descriptive survey of the methods and the means of transportation in the state; (2) a description of the routes and service frequency of the several kinds of carriers; (3) a digest of the statutes affecting transportation in Connecticut. Public and private agencies found the data assembled useful, even before it could be completely organized and classified.

Programs for carrying out the general transportation recommendations have been recognized as essential. Iowa has set forth as objectives: "(1) to plan the most efficient, co-ordinated future Iowa transportation system, including all agencies, practicable of realization within 25 years; (2) to prepare definite 10-year construction programs, in harmony with the 25-year plan, for all existing and prospective Iowa transportation agencies." The Iowa Transportation Committee has presented a tentative outline of the construction needed on the different elements of Iowa's transportation system from 1935 through 1944.

The development of railroad lines and their freight and passenger terminals is dependent primarily on the initiative of the railroad companies but is nevertheless of such public importance that it is an essential part of any state or regional plan.

A brief history of railroad development within the area being studied is essential in order to understand the problems involved. Through trunk-line railroads are primarily carriers of freight and it is therefore essential that they follow comparatively low-grade routes over which heavy freight trains can be economically operated. The prevailing grades upon such railroad lines fix to a considerable degree their standing as trunk-line facilities and almost all available routes already have been utilized.

The sites for suitable trunk-line freight and passenger terminals are also limited and, as a result of the rapid increases in land values during the past two or three decades, it would now entail almost prohibitive expense for another railroad to obtain such facilities as would enable it to compete with existing lines. It is therefore true in most cases that, for state and regional planning purposes, it can be assumed that the present trunk-line routes are the only ones that need be considered.

Railroads have been recognized by most state planning boards as essentially a national transportation medium whose major problems can be solved only as part of a comprehensive national plan.

The Colorado State Planning Board points out that there is a greater need than ever for improved railroad transportation. A particular need is more speed and better roadways upon which to maintain schedules.

The Colorado report also suggests that two new railroad lines in the state are desirable, one a connection which would result in the saving of approximately 70 miles in distance, the other the construction of a branch line into untapped territory. The Utah preliminary plan on transportation suggests, in the following statement, consideration of the desirability of new lines. "Extension of rail facilities into sections of the state where they are not available now must be considered. It is said the largest productive area in the United States without rail facilities is in the Uintah Basin.

The Kentucky State Planning Board calls attention to the fact that several sections of the state are without railroad facilities.

In the matter of abandonment of existing railroad lines, the first step undertaken by many boards was a mapping and computation of the mileage of railroad lines abandoned to date.

A number of state planning boards have recognized the desirability of studying proposed future abandonments to determine whether they are advisable.

Railway Buying Big Factor in Industrial Market

Eighteen cents of each revenue dollar for supplies in 1934—Three thousand dollars per mile under 1929

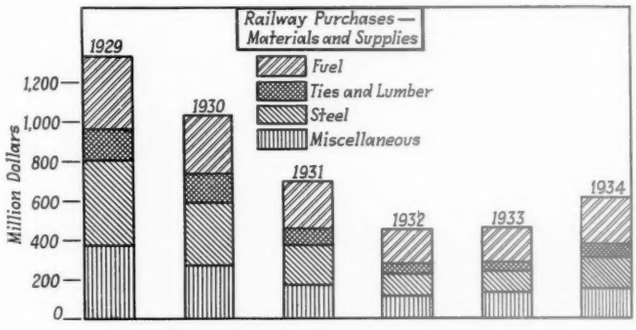
THE Class I railroads of the United States spent 18.4 cents of each dollar earned, or the equivalent of $2,500 per mile of road, for fuel and materials and supplies in 1934, exclusive of new locomotives and cars and contract work. Purchases were highest per mile on the Northwestern region and lowest per revenue dollar in the Pocahontas region. Railroads with less than 1,000 miles of lines spent in the aggregate more per dollar of revenue than the largest companies while the combined purchases of roads operating under receivers or trustees were less per mile of road but much greater per revenue dollar than the purchases of all the roads. While purchases in 1934 took only 2.8 cents or 13 per cent less of each revenue dollar in 1934 than in 1929, the total expenditures in 1934 for fuel and materials and supplies were less than the corresponding purchases in 1929 by approximately $3,000 per mile of road. The figures are drawn from an analysis which the *Railway Age* has made of itemized railway purchases in 1934.

There were wide variations in the proportion of the supply dollar expended in 1934 by various roads for similar classes of material and also wide variations in the gross expenditures per mile of road operated, as was to be expected from the fact that purchases per mile largely disregard such factors in buying as topography, the intensity and kind of traffic and the distance from markets, and they also disregard the relative volume of purchasing in the previous year. There was greater uniformity, however, in the relation of the gross purchases of various roads to their respective earnings.

For the entire country, purchases of materials and supplies, exclusive of fuel in 1934 were equivalent to $1,600 per mile and 11.7 cents of each revenue dollar. The corresponding purchases totalled $2,840 per mile and 13.0 per cent of operating revenues in the New England region; $2,620 per mile and 10.5 per cent of revenues in the Great Lakes region; $1,790 per mile and 10.2 per cent of revenues in the Central Eastern region; $1,420 and 14.3 per cent of revenues in the Southern region; $1,190 per mile and 15.5 per cent of revenues in the Northwestern region; $1,190 per mile and 11.6 per cent of revenues in the Central Western region; and $1,150 per mile and 13.8 per cent of revenues in the Southwestern region. Disregarding the Pocahontas region, owing to incomplete data, total purchases were $2,940 higher or 180 per cent more per mile of road in the New England region than in the Southwestern region, and took 8.5 cents, or 54 per cent more of each dollar of revenue in the Northwestern region than in the Central Eastern region; and the purchases less fuel averaged $1,690 or 148 per cent more per mile of road in the New England region than in the Southwestern region and 5.3 cents, or 53 per cent, more of each revenue dollar in the Northwestern region than in the Central Eastern region; while miscellaneous purchases averaged $1,410, or 150 per cent, more per mile in the New England region than in the Northwestern region and 4.5 cents, or 52 per cent, more of each revenue dollar in the Northwestern region than in the Central Eastern region.

Railway Purchases, 1934, by Regions

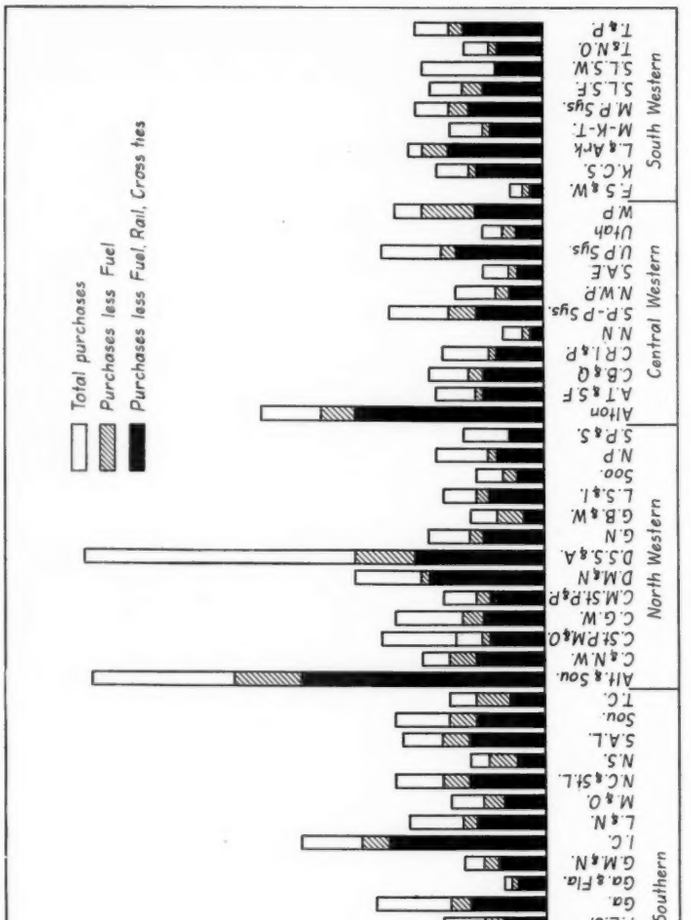
	Dollars per Mile of Road Operated			Per cent of Operating Revenue		
	Total Purch.	Ties, Rail, Misc.	Misc.	Total	Ties, Rail, Misc.	Misc.
New England Region..	$4,450	$2,840	$2,350	20.1	13.0	10.7
Great Lakes Region...	4,570	2,620	2,220	18.2	10.5	8.8
Central Eastern Region	4,320	1,790	1,440	15.9	10.2	8.7
Pocahontas Region....	4,400	2,650	2,200	13.2	9.1	7.5
Southern Region.....	2,180	1,420	1,140	21.0	14.3	11.1
Northwestern Region..	1,870	1,190	940	24.4	15.5	12.2
Central Western Region	1,960	1,190	970	19.2	11.6	9.5
Southwestern Region..	1,630	1,150	950	19.5	13.8	11.2
United States.....	2,500	1,600	1,320	18.4	11.7	9.7



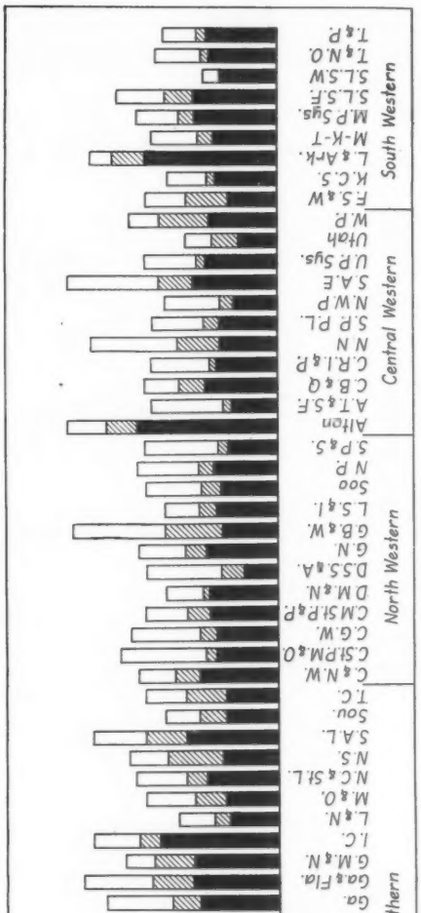
Railway Purchases 1929-1934

The more that railway purchases are subdivided, the less satisfactory is the measure of mileage alone since it does not differentiate between those railroads which have very little mileage and heavy traffic, the railroads which have much second and third track and those which traverse large areas which produce little or no revenue. It is also recognized that the consumption of many supplies, especially those required for train operation and the maintenance of equipment, are more closely related to the utilization of equipment than to mileage operated. The mile is the fixed measure, however, and produces many interesting comparisons among the itemized expenditures, especially in the case of railroads which are otherwise reasonably comparable; and the detailed figures especially show the substantial degree to which all railroads indiscriminately draw upon the basic industries of the country for their ramified requirements.

Considering classes of material for which little or no comparative information has been available to railway managements, the analysis of purchases shows that, by comparison with the weighted average expenditure of $120 per mile last year by all Class I railroads for lumber, timber and other forest products exclusive of cross ties, the timber and lumber purchases amounted to $160 per mile in the New England region, $176 in the Great Lakes region, $102 in the Central Eastern region, $155 in the Southern region, $84 in the Northwestern



Comparative Purchases of Fuel, Materials and Supplies in 1934 per Mile of Road Operated



Ratio of Purchases of Fuel, Materials and Supplies in 1934 by Various Railroads to Their Gross Annual Operating Revenues

Selected Divisions of Railway Purchases, 1934

	Dollars per Mile of Road Operated															Per cent of Oper. Rev.		
	Lumber ex. X-Ties	Rail	Wheels Tires Axles	Track Mat'l ex. Rail	Flues	Tel. & Sig.	Bolts Rivets Springs	Cast-ings	Total[6] Iron & Steel	Oils[7] and Grease	Cop-per	Elec. Mat'l	Total Purch.	Ties Rail Misc.	Misc.	Total	Ties Rail Misc.	Misc.
New England Region:																		
Bangor & Aroostook.	$75	$250	$43	$213	$16	$5	$30	$94[5]	$730	$41	$68	$14	$2,400	$1,330	$980	19.3	12.6	9.2
Boston & Maine....	209	545	134	525	6	190	54	140	1,810	83	138	47	4,820	3,150	2,550	23.4	15.4	12.4
Central Vermont	..	40	..	..	..	..	..	..	....	..	..	..	2,600	1,240	1,020	24.0	11.4	9.4
Maine Central	120	144	51	215	55	41	20	60	630	48	41	14	2,660	1,580	1,000	26.2	14.6	9.6
N. Y., N. H. & H...	..	..	..	..	..	..	..	..	....	..	..	..	6,050	4,000	3,400	17.5	11.7	10.0
Average	160	345	95	382	7	115	40	150	1,290	65	99	32	4,450	2,840	2,350	20.1	13.0	10.7
Great Lakes Region:																		
Ann Arbor	10	0	25	55	5	10	3	61	218	16	51[8]	10	2,040	535	535	18.2	4.7	4.7
Cambria & Indiana..	27	75	95	83	22	0	89	310	872	41	25	6	1,920	1,380	1,130	11.2	8.2	6.7
Delaware & Hudson.	350	260	240	285	44	130	179	410	2,300	85	262[8]	29	5,950	3,750	3,500	22.2	14.0	13.1
D. L. & W.....	..	..	..	..	..	..	..	..	....	..	..	..	7,360	5,061	4,436	16.5	11.3	10.0
Erie	..	..	..	..	..	..	..	..	....	..	..	..	5,950	4,000	2,960	18.4	12.5	9.5
Lehigh & New Eng..	68	560	83	334	31	37	62	93	1,445	63	63	8	3,140	2,150	1,530	20.3	14.2	10.0
Lehigh Valley	225	14	130	65	5	62	148	1,100	1,840	151	151[8]	59	6,700	3,700	3,520	22.6	12.7	12.0
Monongahela	10	369	24	286	5	13	10	28	770	40	23	8	2,020	1,480	730	9.4	6.7	3.4
Montour	76	320	232	99	2	50	142	106	2,960	234	230[8]	38	6,050	4,650	4,075	18.5	14.3	12.4
N.Y.C. Sys. ex. B & A	173	168	161	212	70	65	80	154	1,190	122	276[8]	22	4,180	2,620	2,290	16.5	10.2	8.9
N.Y.C. & St. L.....	..	..	..	..	..	..	..	..	....	..	..	..	3,140	....	....	16.1	..	..
Pere Marquette	..	..	..	..	..	..	..	..	....	..	..	..	2,040	....	....	18.6	..	..
Pitts. & Shawmut...	19	0	22	21	13	1	17	10	204	37	9	4	1,189	802	472	18.5	12.5	7.3
Pitts. & W. Va.....	131	2	31	49	21	21	75	85	460	52	138	27	2,520	1,730	815	12.6	8.6	4.0
Pitts., Shaw. & Nor.	..	..	..	..	..	..	..	..	....	..	..	..	1,065	760	515	21.8	16.0	10.9
Wabash	157	147	53	97	17	27	35	312	880	51	123[8]	34	2,820	1,930	1,510	18.5	12.5	9.9
Average	176	161	140	188	52	60	81	260	1,210	107	230	27	4,570	2,620	2,220	18.2	10.5	8.8
Central Eastern Region:																		
B. & O.....	87	215	91	220	32	51	86	169	1,140	85	154[8]	77	3,700	2,350	2,000	17.2	11.0	9.2
C. R.R. of N. J....	146	21	177	91	11	59	59	200[5]	825	88	258	97	5,850	2,380	2,340	14.6	5.6	5.6
C. & E. I.....	..	..	..	..	..	..	..	..	....	..	..	..	2,360	1,530	1,160	17.3	11.3	8.6
C. & I. M.....	191	0	330	360	7	29	55	360	1,420	190	290[8]	44	4,000	2,920	2,660	17.5	12.8	11.7
C. I. & D.....	..	155	..	28	..	17	..	..	....	..	..	..	1,580	920	665	34.8	20.0	14.8
D. T. & I.....	175	..	52	37	8[2]	12	19	153[3]	310	47	77	12	1,580	1,155	840	12.7	9.3	6.7
E. J. & E.....	172	..	28	115	10	30	81	195	590	95	70	16	2,910	1,870	1,405	12.9	8.3	6.3
Penna. & L. I.*.....	80	340	128	350	26	170	59	163	1,640	88	155[8]	450	5,000	3,320	2,930	15.3	10.2	9.0
Reading Co.	165	226	230	140	25	69	92	250	1,460	92	89[8]	38	5,350	2,650	2,420	14.8	7.2	6.6
Western Md.	183[1]	224	125	242	36	49	56	116	1,060	59	150	10	3,500	2,700	2,000	22.6	17.4	13.0
W. & L. E.....	272	340	250	250	20	75	98	380	2,180	96	130[8]	39	4,400	3,360	2,860	20.2	15.4	13.1
Average	102	276	126	266	27	103	69	174	1,390	86	150	26	4,320	1,790	1,440	15.9	10.2	8.7
Pocahontas Region:																		
C. & O.....	..	..	..	..	..	..	..	..	....	..	..	..	4,500	....	....	13.1	..	..
R. F. & P.....	..	..	..	..	..	..	..	..	....	..	..	..	12,000	7,300	7,300	23.0	14.0	14.0
Virginian	..	..	..	..	..	..	..	..	....	..	..	..	2,480	1,750	1,230	10.7	8.0	5.3
Average	..	..	..	..	..	..	..	..	....	..	..	..	4,400	2,650	2,200	13.2	9.1	7.5
Southern Region:																		
A. & W. P.....	121	0	160	22	14	33	72	147	635	43	132[8]	17	2,350	1,310	1,310	19.5	10.8	10.8
A. B. & C.....	..	..	..	..	..	..	..	..	....	..	..	..	1,100	845	660	25.0	19.3	15.1
A. C. L.....	71	37	37	37	5	14	12	23	260	31	90[9]	14	1,700	1,020	815	24.0	14.4	11.4
Central of Ga.....	77	78	51	35	12	13	19	110	400	33	43	16	1,500	970	790	22.8	14.1	11.4
Charleston & W. Car.	45	59	22	56	2	0	11	47	244	20	47[8]	3	1,240	790	655	22.2	14.1	11.8
Clinchfield	70	132	138	60	21	0	71	129	860	66	68	12	2,680	1,930	1,300	15.8	11.4	7.7
Col. & Grnvlle.....	200	9	31	42	7	0	25	24	190	34	14	11	1,330	865	645	25.2	16.6	12.5
F. E. C.....	47	0	95	22	2	13	20	53	265	31	41[8]	15	1,540	895	650	16.1	9.5	6.9
Ga. R.R.	162	44	115	37	12	2	64	130	505	68	80[9]	18	2,460	1,410	1,100	25.6	14.8	11.5
Ga. & Fla.....	65	0	21	11	6	0	5	32	114	8	16	2	635	415	278	28.9	18.8	12.5
G. M. & N.....	79	119	26	28	5	5	9	25	249	22	24	6	1,195	942	695	22.8	18.0	12.3
I. C.	405	124	111	95	9	28	87	280	1,010	114	87	66	3,620	2,690	2,320	27.2	20.2	17.4
L. & N.....	79	128	85	68	22	42	16	46	540	67	16[8]	26	1,980	1,240	990	14.5	9.1	7.3
M. & O.....	83	118	37	48	16	3	17	26	306	32	43	9	1,380	890	558	19.5	12.5	7.9
N. C. & St. L.....	..	..	..	..	..	..	..	..	....	..	..	..	2,240	1,460	1,080	20.2	13.8	10.1
Norfolk Southern ...	114	125	16	28	4	2	10	9	232	18	13	9	1,125	815	425	21.4	16.0	8.3
S. A. L.....	..	..	..	..	..	..	..	..	....	..	..	..	2,140	1,510	1,060	27.0	19.2	13.4
Southern	111	73	76	92	15	38	14	95	440	52	52[8]	11	2,200	1,430	1,000	17.4	11.4	7.9
Tenn. Cent.	112	80	27	37	6	0	15	23	224	58	34	6	1,410	1,000	550	19.1	13.6	7.4
Average	155	108	78	67	12	26	31	105	520	59	57	25	2,180	1,420	1,140	21.0	14.3	11.1
Northwestern Region:																		
C. & N. W.....	92	115	74	140	10	26	27	89	595	72	56[8]	27	1,820	1,260	1,040	20.2	14.0	11.5
C. St. P. M. & O...	..	..	..	..	..	..	..	..	....	..	..	..	2,400	915	800	23.2	10.2	8.9
C. G. W.....	47	75	95	135	0	28	29	35	510	51	87	2	2,180	1,180	900	21.2	11.5	8.7
C. M. St. P. & P....	76	65	18	134	80	29	14	57	405	58	65[8]	18	1,530	1,030	785	19.5	13.1	10.0
D. M. & N.....	75	0	26	116	38	16	73	205	905	79	123	31	2,820	1,760	1,740	16.6	10.5	10.3
D. S. S. & A.....	..	..	..	..	..	..	..	..	....	..	..	..	6,800	2,800	1,900	19.0	7.4	5.3
G. N.	..	..	..	..	..	..	..	..	....	..	..	..	1,750	1,150	880	20.6	13.7	10.4
Green Bay & West...	35	0	28	23	5	0	13	33	122	17	25	4	1,120	620	300	30.0	16.7	8.1
Lake Sup. & Ishp...	46	0	28	65	23	7	34	170	490	23	30[8]	12	1,500	980	800	16.8	11.1	8.9
M. St. P. & S. S. M.	..	..	..	..	..	..	..	..	....	..	..	..	1,050	590	450	19.6	11.2	8.5
N. P.	87	42	32	49	5	27	16	48	292	34	35	14	1,560	785	720	20.2	11.6	9.4
S. P. & S.....	61	5	61	24	5	4	16	37	195	21	45	14	1,170	525	455	19.3	8.7	7.5
Average	84	66	44	115	9	27	21	68	455	47	59	20	1,870	1,190	940	24.4	15.5	12.2
Central Western Region:																		
Alton	183	0	69	95	18	48	75	91	530	62	187[8]	52	4,250	3,320	2,790	31.6	24.5	20.6
A. T. & S. F.....	..	..	..	..	..	..	..	..	....	..	..	..	1,750	1,000	880	18.4	7.8	6.9
C. B. & Q.....	63	113	45	108	9	38	22	52	495	30	24[8]	21	1,680	1,140	890	19.0	13.0	10.2
C. R. I. & P.....	61	14	41	23	17[3]	13	17	83[5]	260	31	52	21	1,455	760	710	18.2	9.5	8.9
Nevada Nor.	7	0	..	26	..	2	9	5	113	15	14	3	590	310	190	27.6	14.5	8.9
S. P. Co.....	110	214	43	100	..	55[4]	..	..	524	..	9	..	2,340	1,400	1,000	18.4	10.9	8.7
N. W. Pac.....	116	71	28	62	..	31[4]	..	..	210	..	10	31[9]	1,350	680	520	16.3	8.2	6.2
S. D. & A. E.....	43	14	10	36	..	18	..	..	90	..	7	18	870	485	356	30.8	17.3	12.6
U. P.	75	96	79	123	9	35	44	144	745	54	127[8]	7	2,375	1,460	1,295	19.3	11.8	10.5
Utah Ry.	5	..	24	55	..	5	3	32	135	18	33	6	880	640	372	13.1	9.6	5.6
W. P.	..	..	..	..	..	..	..	..	....	..	..	..	2,180	1,800	1,000	21.4	17.8	10.0
Average	77	108	53	90	12	43	30	95	510	40	58	17	1,960	1,190	970	19.2	11.6	9.5
Southwestern Region:																		
Ft. S. & W.....	..	..	..	..	..	..	..	..	....	..	..	..	517	266	195	19.0	13.5	7.3
K. C. S.	..	..	..	..	..	..	..	..	....	..	..	..	1,740	1,120	1,020	16.0	10.2	9.3
La. & Ark.....	238	0	23	179	8	3	31	51	465	30	24	7	2,040	1,770	1,450	27.8	24.2	19.8
M-K-T	57	54	29	51	15	13	35	92	370	29	48	12	1,440	940	760	18.0	11.7	9.5
M. P. Sys.....	110	91	81	215	18	8	..	..	411	28	..	..	1,880	1,380	1,110	20.6	15.2	12.2
St. L.-S. F.....	117	112	38	115	4	5	32	58	465	48	74[8]	33	1,710	1,200	900	23.6	16.5	12.5
St. L. S. W.....	68	0	47	23	7	2	16	95	222	30	78[8]	7	845	680	675	10.6	8.6	8.5
T. & N. O.....	94	0	33	80	..	31	..	..	220	26	..	..	1,250	770	710	17.8	11.0	10.0
T. & P.....	190	37	76	59	32	30	22	145	495	79	56	12	1,910	1,360	1,190	16.7	11.9	10.4
Average	108	86	55	130	15	12	30	84	312	36	63	20	1,630	1,150	950	19.5	13.8	11.2
United States—Average	120	129	68	130	15	38	36	102	670	57	94	41	2,500	1,600	1,320	18.4	11.7	9.7

* Excluding freight and handling charges. [1] Plus bridge ties. [2] Plus arch brick. [3] Plus copper tubing, lead and arch brick. [4] Plus electrical material. [5] Plus forgings. [6] Excluding locomotive appliances and air brake material. [7] Plus waste and boiler compound. [8] Plus steel pipe and fittings, hardware and hand tools. [9] Plus telegraph and signal materials.

region, $77 in the Central Western region, and $108 in the Southwestern region. Purchases of rail, including some secondhand rail, averaged $345 per mile in the New England region, $161 in the Great Lakes region, $276 in the Central Eastern region, $108 in the Southern region, $66 in the Northwestern region, $108 in the Central Western region, $86 in the Southwestern region and $129 for the United States.

As compared with $130 per mile over the United States, purchases of track fastenings averaged $382 in the New England region, $188 in the Great Lakes region, $266 in the Central Eastern region, $67 in the Southern region, $90 in the Northwestern region, $90 in the Central Western region and $130 in the Southwestern region. On the other hand, purchases of signal, interlocking, telegraph and telephone material which averaged $38 per mile for the United States were equivalent to $115 per mile in the New England region, $60 in the Great Lakes region, $103 in the Central Eastern region, $26 in the Southern region, $27 in the Northwestern region, $43 in the Central Western region and $12 in the Southwestern region. Aggregate purchases of materials and supplies of iron and steel, excluding locomotive appliances, air brake material, and items ordinarily classed as hardware, averaged $670 per mile of road for the United States. As compared with this, the corresponding purchases averaged $1,290 in the New England, $1,210 in the Great Lakes, $1,390 in the Central Eastern, $520 in the Southern, $455 in the Northwestern, $510 in the Central Western and $312 in the Southwestern regions, respectively.

Whether a larger road should or does purchase more or less than a smaller road has always been a fruitful source of discussion, not without controversy. It has often been contended that the larger roads have an advantage over the small roads and make larger purchases proportionately. On the other hand, smaller roads, while representing a larger variety of operating conditions, often are more compact and can devote closer attention to the infinite details of buying. Without attempting to settle this question because of the many factors which must be taken into consideration, aside from current expenditures for materials and supplies, comparison made by combining the purchases of the 10 railway systems with the largest mileage and of 40 railroads with less than 1,000 miles each, shows that the total purchases

(*Continued on page 582*)

Freight Car Loading Exceeds 1934 Total

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 19 totaled 732,947 cars, a decrease of 1,327 cars as compared with the week before but an increase of 92,220 cars, or 14.4 per cent, over the total for the corresponding week of last year. This was also an increase of 75,942 cars over the corresponding week of 1933. The cumulative loading, for the 42-week period from January 1 to October 19, 25,312,516 cars, also exceeded that for the corresponding period last year, which was 25,272,584 cars. All commodity classifications except livestock showed increases as compared with last year and miscellaneous freight, merchandise, and livestock showed increases as compared with the previous week. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

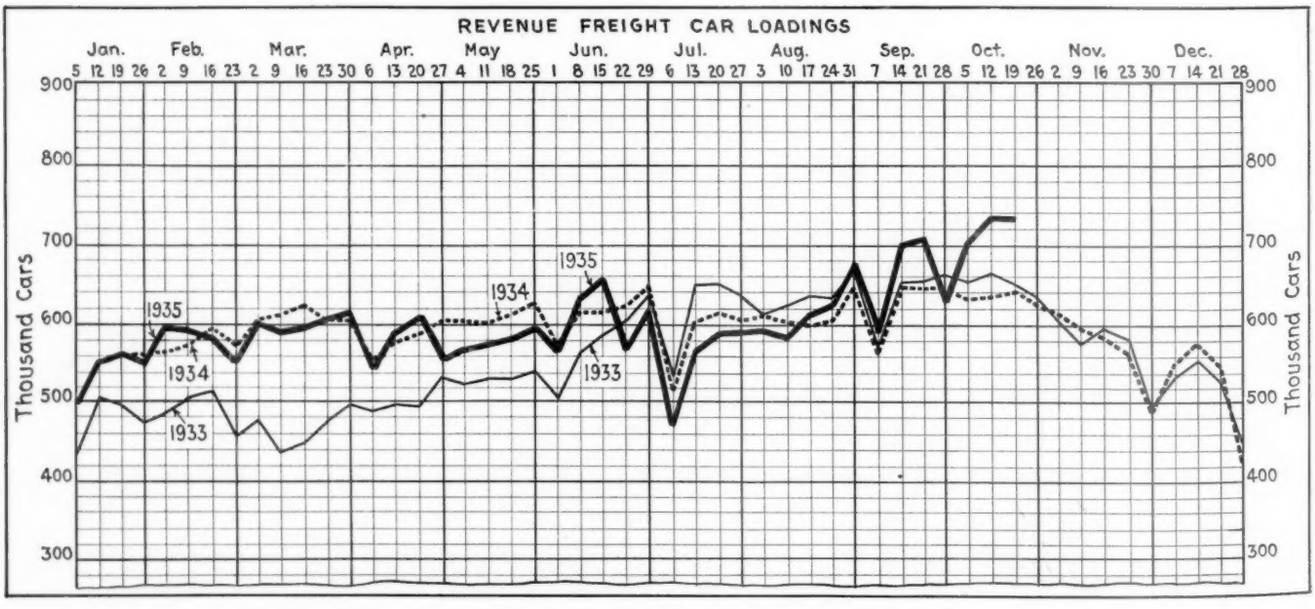
Revenue Freight Car Loading
For Week Ended Saturday, October 19

Districts	1935	1934	1933
Eastern	151,459	136,939	139,131
Allegheny	133,420	117,050	123,694
Pocahontas	53,125	43,845	45,936
Southern	99,937	88,828	88,719
Northwestern	114,690	90,352	92,225
Central Western	119,353	109,069	112,779
Southwestern	60,963	54,644	54,521
Total Western Districts	295,006	254,065	259,525
Total All Roads	732,947	640,727	657,005
Commodities			
Grain and Grain Products	36,118	31,292	28,590
Live Stock	22,963	27,392	23,716
Coal	138,435	125,975	130,103
Coke	7,427	5,838	6,520
Forest Products	31,376	23,345	24,510
Ore	32,307	16,685	28,600
Merchandise L.C.L.	166,488	163,400	173,531
Miscellaneous	297,833	246,800	241,435
October 19	732,947	640,727	657,005
October 12	734,274	636,999	670,680
October 5	706,877	632,406	662,373
September 28	630,771	646,084	669,186
September 21	707,644	644,498	659,866
Cumulative Total, 42 Weeks	25,312,516	25,272,584	23,604,738

Car Loading in Canada

Car loadings in Canada for the week ended October 19 totaled 56,285 cars, as against 58,571 for the previous

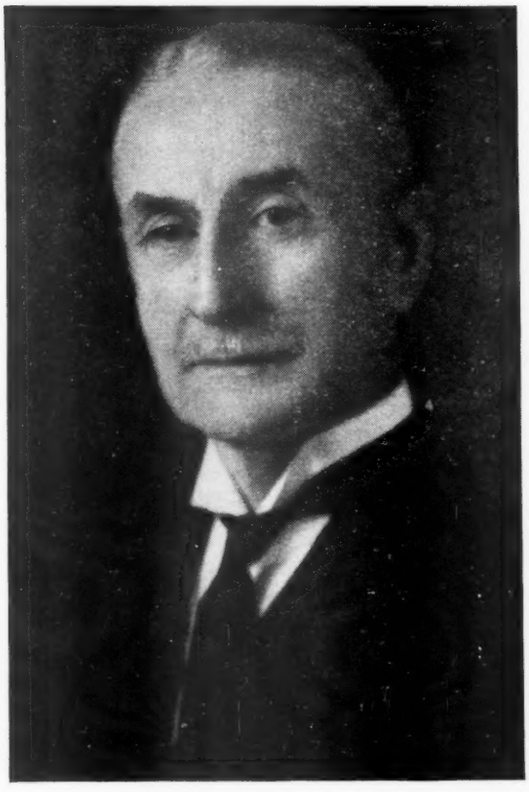
(*Continued on page 582*)



Percy R. Todd, Bangor & Aroostook President, Dies

Well-known in the railway field, he had been chief executive of the B. & A. since 1913

PERCY R. TODD, whose death on October 23 was reported in the *Railway Age* of October 26, had been affiliated with the Bangor & Aroostook since 1907 and, except for a war-time interval, had been its president since 1913. He was 75 years old. Mr. Todd's health had been somewhat impaired in recent years although he remained active in the affairs of the railroad until late in August when his hip was fractured in a fall. Following that accident he had been a patient at the Eastern Maine General Hospital in Bangor, Me., where he died.



Percy R. Todd

Although the Bangor & Aroostook is a comparatively small railroad Mr. Todd's outstanding record as its president made him a distinguished figure in the railroad world. The B. & A. is one of the few roads which has been able throughout the depression to continue dividend payments on its common stock; the 1929 rate of seven per cent (on $50 par value) was maintained through 1931, while four per cent was paid in 1932 and 1933 and five per cent in 1934. More remarkable is the fact that in each of the depression years, except 1931, these dividends have been earned by a comfortable margin. In commenting upon Mr. Todd's devotion to the B. & A. and the territory which it serves the Bangor Daily News referred also to his pre-eminent position in the railroad industry. In this connection it said:

"Although Mr. Todd's exceptional ability was widely recognized in Maine, only those with a practical understanding of railroad affairs fully appreciate how distinguished a figure he had become in America's railroad world. Although he never permitted mention of the fact in the papers, and did not discuss it even with his most intimate associates, it is known that he refused presidencies of several great railroads within the past dozen years.

"Mr. Todd's services to the Bangor & Aroostook, whose development and prosperity have been entwined with the development and prosperity of Bangor and the great empire of Northern Maine, were outstanding. Of keen mentality and tireless energy, and with a genius for management that was sensed by the public but fully appreciated only by those having intimate knowledge of railroad affairs, he established it among the most unusual railroads in America—one of the very few that have earned dividends through the dark years of the depression. Small in comparison with the great transcontinental lines, and located in a remote corner of New Engand, it was pointed to as a model by railroad men from one end of the country to the other. It remains as an industrial monument to his life work."

The growth of the Bangor & Aroostook during the past 23 years of Mr. Todd's presidency has been a growth of traffic and revenues—the road operates today approximately the same mileage as it did in 1913. Gross revenues, however, increased from $3,252,421 for the year ending June 30, 1913, to a 1930 peak of $8,365,757. The low-point of the depression was reached in 1933 when gross was $5,805,512. Meanwhile, expenses were kept in check so that in each depression year there has been a substantial balance of net income; after deducting dividend payments the profit and loss credit balance has increased from $4,740,675 as of December 31, 1929, to $5,637,442 as of the end of 1934.

Conservative financing also characterized Mr. Todd's regime. In 1913 the road's net funded debt was $23,520,000, whereas in 1934 it was $18,200,000; fixed charges in 1913 were $1,133,517—in 1934 they were $763,599 and were earned 2.21 times. A bond-conversion plan now being carried out is expected further to reduce fixed charges. At the close of 1934 the road had no bank loans nor floating debt.

Percy R. Todd was born on December 4, 1859, at Toronto, Ont. Following his graduation from the Collegiate Institute at Ottawa, he entered railroad service as clerk and telegraph operator with the St. Lawrence & Ottawa, now part of the Canadian Pacific, which positions he held until 1875. He then became Canadian agent of the Ogdensburg & Lake Champlain, now the Rutland, and in 1882 he was appointed general traveling agent of the National Despatch Line, now the Grand Trunk, at Chicago, Ill. From July to December, 1885, Mr. Todd served as commercial agent at Albany, N. Y., for the New York, West Shore & Buffalo, now New York Central, and from December, 1885, to October, 1886, he was chief clerk in the general freight department at New York. He then served as general freight

and passenger agent at Ottawa, Ont., for the Canada Atlantic, now Canadian National, until December, 1889, when he became general freight agent of the West Shore. From December, 1892, to February, 1901, he was traffic manager of the latter road, and from February, 1901, to November, 1903, Mr. Todd served as second vice-president of the New York, New Haven & Hartford and then as first vice-president.

Mr. Todd served as vice-president of the Bangor & Aroostook from January, 1907, to January, 1913, when he became president, the position he held until his death, except for the period of government control when he was successively assistant district director and district director of lines in New England at Boston.

Report on Crossing Protection

THE Joint Committee on Grade Crossing Protection of the Association of American Railroads of which Frank Ringer, chief engineer, M-K-T., St. Louis, Mo., is chairman, has just issued bulletin No. 2, superseding bulletin No. 1 on Railroad Highway Crossing Protection to present the recommended standard devices and practices in their latest approved form. Since the appearance of bulletin No. 1, certain devices have been redesigned, other portions have been eliminated and additional provisions have been drafted. Various organizations, national in character, such as the National Association of Railroad and Utilities Commissioners, the American Association of State Highway Officials, and the National Conference on Street and Highway Safety have formally endorsed the recommendations of the Committee.

The new bulletin eliminates all drawings and references to the center-of-street location for crossing signals. The use of a rotating-disk stop sign, in conjunction with a flashing-light signal, is provided for by a note. Several new drawings are included to explain the detail construction of signs.

The revised recommendations of practice for new installations, as shown in bulletin No. 2, are as follows:

1. Railroad advance warning signs should be installed and maintained by the highway authorities in accordance with Sections No. 145 and 156 of the Manual on Uniform Traffic Control Devices for Streets and Highways of the U. S. Bureau of Public Roads, 1934.

2. Highway crossing signs shall be used as required where manual or automatic protection is not provided:

(a) Painted crossbuck sign

(b) Reflector crossing sign assembly may be used instead of the painted crossbuck sign, where adequate protection is not provided by the painted crossbuck sign but where automatic signal protection is not required.

3. At crossings on heavily traveled highways where conditions justify, either of the following standard visible warning signals shall be installed:

(a) Wigwag type

(b) Flashing-light type.

4. At crossings where wigwag or flashing-light signals are used, one shall be placed on each side of the track.

5. Circuits for automatic operation of wigwag or flashing-light signals shall be arranged so that crossing signals will operate until the rear of a train reaches or clears the crossing.

6. A bell shall be used on crossing signals when required by local conditions.

7. An electrically or mechanically-operated signal used for the protection of highway traffic at railroad-highway grade crossings shall present toward the highway, when indicating the approach of a train, the appearance of a horizontally swinging red light and/or disk.

8. The railroad standard highway crossing sign and the signal shall be mounted on the same post. Either a signal of the flashing-light type or one of the wigwag type may be used, but both shall not be placed on the same post.

9. Automatic signal devices used to indicate the approach of trains shall so indicate for not less than 20 sec. before the arrival of the fastest train operated over the crossing. Note: Local conditions may require a longer operating time; however, too long an operation by slow trains is undesirable.

Flashing-Light Type *

10. The lamps shall preferably be not less than 7 ft. nor more than 9 ft. above the surface of the highway.

11. Signal lights shall shine in both directions along the highway and shall be mounted horizontally on 2 ft. 6 in. centers. Lamps, when arranged in pairs back to back, shall open at the front and be designed so that the door will open to the side or downward.

12. Lights shall flash alternately. The number of flashes of each light per minute shall be 30 minimum, 45 maximum.

13. Lamp units shall be properly hooded. Backgrounds, 20 in. in diameter, shall be painted black on both sides.

14. When lamps are operated at normal voltage, the range, on tangent, shall be at least 300 ft. on a clear day, with a bright sun at or near the zenith.

15. The beam spread shall be not less than 3 deg. each side of the axial beam under normal condition. This beam spread is interpreted to refer to the point at the angle mentioned where the intensity of the beam is 50 per cent of the axial beam under normal conditions.

16. Lenses or roundels shall be 5⅜ in. minimum, 8⅜ in. maximum.

17. Transmission values, based on A.A.R. standard scale, shall be 150 to 220 where a plain cover glass with reflector is used; 220 to 300 where signals are used without reflectors or where a ribbed Spreadlite lens is used in front of the reflector.

18. Signal shall display a satisfactory short range indication.

19. Peep holes may be used.

Wigwag Type

20. Length of stroke is the length of cord which subtends the arc, determined by the center of the disk in its extreme positions, and shall be 2 ft. 6 in.

21. Size and painting of disk shall be as shown on A.A.R. Signal Section 1553.

22. Movement from one extreme to the other and back constitutes a cycle. The number of cycles per minute shall be 30 minimum, 45 maximum.

23. Signal lights shall shine in both directions along the highway.

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* Where permitted or required by governmental authority, a rotating disk bearing the word "Stop" in reflector lenses may be used instead of the "Stop on Red Signal," or the illuminated "Stop" sign.

The 87-Year-Old Starrucca Viaduct on the Erie near Lanesboro, Pa. Total Length 1,040 ft., 17 Arch Spans of 50 ft.

Bridge Men Meet at Chicago

Reports on cleaning steel bridges, inspection of bridges, treated timber in buildings, welding of pipes, bridge floors, pumps, and sub-aqueous inspections embody valuable information

Part II

SUPPLEMENTING the report of the forty-second convention of the American Railway Bridge and Building Association that appeared in the *Railway Age* of October 26, we present below abstracts of the committee reports and excerpts from the discussions that followed their presentation. These reports cover the cleaning of steel bridges, the inspection of bridges and buildings, the use of treated timber in buildings, the welding of pipes, types of floors for highway bridges, pumping equipment, and the inspection of submerged bridge substructures. A paper by C. Earl Webb division engineer of the American Bridge Company, on Trends in Bridge Design, Erection and Maintenance will appear in a later issue.

Cleaning Steel Bridges

A committee, of which E. C. Neville, bridge and building master, Canadian National, Toronto, Ont., was chairman, presented a report on The Cleaning of Steel Bridges Preparatory to Painting. An abstract of this report, which went into detail as to methods for doing the work and the relative results and costs of these methods, follows:

It is more economical to do painting before the existing paint actually breaks, as one (or possibly two) additional coats applied to the old paint will restore its condition and avoid the cost of cleaning the surface of the metal and build up the paint coats. While this is a condition not likely to be attained in regular maintenance, the nearer it can be met, the less costly it will be and the better will be the result. A modern steel structure painted frequently enough to avoid any loss of metal due to rust will last forever, whereas neglect may easily result in rapid deterioration and premature retirement of the structure.

The methods and the cost of cleaning depend upon the condition of the structure, and range from the wire brushing of a few spots to the sand-blasting of the entire structure. There are a number of causes for the rapid destruction of the paint and the early appearance of rust. Among them are salt air from the ocean, fumes from manufacturing plants, gases from locomotives, brine drippings from refrigerator cars, poor paint and poor application of good paint. If the cleaning can be done as soon as rust spots begin to appear, hand scrapers and wire brushes are suitable, and the work of cleaning is moderate in cost.

A consistent program of spot cleaning and spot painting will prevent deterioration for a considerable length of time, although this practice may not be as economical as a full paint job at the proper time. Due to local causes, such as brine drippings, etc., certain parts of a structure show signs of rust much sooner than others and these parts should be cleaned and painted not only more frequently, but also before there is any actual loss of metal.

It is not good practice to permit a bridge that is to be retained in service to become so badly rusted that excessive cleaning is necessary, because there is always a loss of metal from corrosion and because of the difficulty of preparing and repairing such a badly rusted structure so that it will be in as good condition after painting as when it was new. Structures that are to be removed for other reasons may be allowed to become somewhat rusty without serious loss of strength or service.

In undertaking the preparation of this report, the committee recognized that, owing to the greatly restricted appropriations for maintenance work during the past few years, most railroads are faced with the problem of either undertaking a heavy bridge painting program or of resorting in the near future to a much heavier expenditure for extensive repairs or even complete renewal of many of their structures. With this in mind, every effort was made to discover some practical and economical means of preventing or retarding further damage to structures that are in a state of progressive deterioration.

It is the belief of the committee that serious consideration should be given to the use of oil or other preparations as a means of loosening rust and scale, before attempting expensive cleaning operations, as well as for the purpose of retarding further corrosion and thereby extend the intervals between the times when structures require thorough cleaning and painting.

Inspection of Bridges and Buildings

A committee on the Inspection of Bridges and Buildings in the Light of Today's Deferred Maintenance, of which D. T. Rintoul, general bridge inspector, Southern Pacific, was chairman, presented a report which discussed the importance of inspections and the method of procedure for each class of structures. It also included lists of instructions which should be issued to bridge

and tunnel inspectors, and showed typical information which should be included in the report of a building inspection. An abstract of the report follows:

The inspection of structures is a very important function at any time, as the safe operation of a railroad is dependent upon its thoroughness, and an economical program of maintenance can be based only upon the reports developed through thorough inspection of the property. During normal times the renewal of structures is carried on in an orderly manner, without waiting to secure the very last bit of safe use out of them. Because of the low earnings of the last few years, it has become necessary to carry structures just as long as repairs will render them safe for operation and to postpone their renewal as long as possible. Therefore, although the manner of inspection itself may have changed but little, it has become necessary to record the inspection notes in greater detail and make more frequent inspections of the structures that have been repaired. These inspection notes must be made in sufficient detail to show to what extent further repairs are advisable, with a view to postponing the greater expense of renewal.

A number of railroads have consolidated divisions or even abolished the positions of bridge and building supervisors or master carpenters. As a general rule, however, those responsible for the inspection of bridges and other structures have been retained as a part of the new organization, so that proper inspections by competent men may be continued. Greatly reduced traffic, particularly on branch lines (with their subsequent abandonment), permit certain reductions in supervisory forces without in any way affecting the general inspection program.

The responsibility for the safe operation of trains over structures rests primarily with the bridge and building supervisor, or master carpenter, and with the division engineer. This is true even on those roads where bridge and building inspectors are assigned to each division. Curtailment of repairs and renewals throws an added burden upon these supervisory officers and it goes without saying that structures should now receive more of their personal attention and inspection than in former years when maintenance funds were more liberal.

On those roads where bridge inspectors are a part of the division staff, complete inspection of all such roadway structures as culverts, arches, trestles, bridges, highway bridges, etc., should be made at least every three months. Additional inspections should be made at more frequent intervals where a structure calls for special attention, such as undue vibration under load, defective members, settlement or other irregularities, or where deterioration is taking place. The records of these inspections should show the exact condition of each structure and the division bridge inspector should make himself familiar with the physical condition of every structure in his territory. Reports on these inspections should be made to the bridge and building supervisor and the division engineer.

One result of the low earnings of the last few years is a greater reduction in the maintenance work on buildings than on any other single facility. During normal times only a few roads maintained a regular inspection, the majority depending on their traveling carpenters or carpenter gangs, who made periodical trips over their districts, doing all the inspection and work that were necessary, thus covering all the outlying districts and the smaller terminals.

Where special repairs were necessary, reliance was placed upon the agent, section or shop foremen to report them and these repairs were handled by the traveling carpenter. At the larger terminals carpenter gangs were constantly at work maintaining the different structures. During the last few years, there has been such a curtailment in expenditures that traveling carpenters and gangs have in many cases been eliminated and all but the most urgent and necessary repairs have been postponed. Under these conditions, it has become even more necessary than in the past that the inspection of buildings be made carefully and intelligently in order that expenditures for maintenance may be held to a minimum consistent with economy, both present and in the future.

Treated Timber in Buildings

A review of the causes of the relative short life of untreated wood in railway structures and the means of overcoming the effects of decay and insect attack, as well as the extent to which treated lumber is beginning to be used in buildings, was presented by the committee of which L. C. Winkelhaus, architect, Chicago & North Western, was chairman. An abstract of this report follows:

The rising cost of lumber in building construction, as well as the cost of the labor involved in its installation, have forcibly shown the necessity for greater care in the protection of the material to assure economical service and long life after installation. Probably the greatest waste of wood at present occurs through decay and insect attack. The most effective method of preventing decay in those parts of a structure subject to moisture is to poison the food on which the fungi live. Wood preservatives serve this purpose.

Damage to wood in buildings by wood-boring insects is second only in importance to damage by decay. Probably the best known wood-boring insects are termites. They have been discovered with increasing frequency throughout a large part of the United States.

Habits of Termites

Termites can burrow into the hardest of woods, provided they have access to moisture in the ground. In burrowing into the wood, they generally follow the grain. In most cases, termites attack from the inside and spraying with chemicals will not retard their activities. It has been definitely established that wood treated with preservatives in accordance with accepted standards of pressure treatment is immune to termite attack. A number of preservative materials are available, but the most widely known and used are coal-tar creosote and zinc chloride.

In order to obtain information concerning the extent to which treated timber is used in buildings, a questionnaire was sent to about 40 members of this association, representing railroads in various parts of the country. From the replies received, it was found that treated timber is being used rather extensively in repair and renewals, as well as in new construction.

Some roads report that treated timber has been used in the construction of the ordinary type of engine house with a wooden roof deck on framed supports. Treated material is used for the roof decking, purlins, girders and posts. The reason given for this practice is that steam from housed locomotives produces conditions ideal for decay, which treatment is designed to overcome. Treated timber has also been used for window frames and sash members in engine houses.

The majority of outlying freight and passenger stations are constructed of wood. According to the data received, treated caps and sills are sometimes used in the original construction for protection against termites as well as decay. Joists in damp locations and without adequate air circulation are subject to early decay if not treated.

Treated timber has been used extensively in water station construction. The use of treated wood post supports, caps, bracing and floor joists for wooden water tanks adds a considerable number of years to the life of such members. On some roads, the entire tub is constructed of treated material, while on other roads only the ceiling and roof of the tub are treated.

Western roads maintain stock yards at practically all small stations. These facilities consist of shelter sheds, fences, chutes, gates, loading platforms, etc. Practice in the use of treated material in these facilities is not uniform. Except for those members in contact with or below ground level, such as posts, sleepers, sills, floor joists, etc., there is apparently no necessity for using treated material. The use of creosoted timber on platforms used for swine or sheep has resulted in complaints that the creosote in the timber burns the feet of such stock.

Discussion

The discussion of this report revolved largely around the activities of termites, which have reached an alarming stage in nearly all parts of the country. Various methods of determining the presence of termites were presented and discussed. A series of tests were described in which it was found that creosoted-timber treated by the pressure method was the most effective means of rendering the wood immune to attacks by termites.

Welding Pipes for Water Supply

A report on the advantages of welding pipes for water, gas, oil and steam lines and in plumbing installations was presented by the chairman, C. Miles Burpee, research engineer, Delaware & Hudson. After reviewing the development of the practice of welding pipe lines, and of the methods employed, the report, which is abstracted below, discussed the characteristics and efficiency of welded joints, the economy and the flexibility of welded pipe installations:

Practically all sizes of wrought iron and steel pipe are being welded successfully and economically, while several cases are on record of the welding of brass pipe with equal advantage. Welded lines are used for the transmission of water, steam, air, oils and gases with reported pressures varying from 65 to 150 lb. per sq. in. Some railways are using welding to advantage on small jobs, as in small houses or stations. The organizations for welding vary considerably, depending upon the location, type of work and the territory under the direct supervision of the person responsible for the maintenance of pipe lines on divisions, districts or systems.

Changes of direction due to unforeseen obstructions are made more readily and economically during installation with welded than with threaded pipe. Greater economy in installation may be obtained because welding involves less handling of machinery and obviates the handling of pipe to and from the threading machines. Welding outfits are transported to and along pipe lines more readily and economically than are threading machines, especially during the installation of pipe of large sizes. A smaller organization is also able to handle welded lines.

During 1932, the General Electric Company conducted a series of tests designed to secure accurate data on the characteristics of arc-welded pipe joints. The conclusions indicate an average tensile strength of 60,000 lb. per sq. in., and an average ductility of free-bend test of 45 per cent, while freedom from slag inclusions and prosity come well within the A.S.M.E. Boiler Code requirements for Class II pressure vessels.

Ordinarily, beveled pipe may be procured for welding at a considerable saving over that with threads and couplings. No scrap pipe or expensive fittings are left over. Stock lengths of pipe, which are obtainable at lower cost, may be used, since it is unnecessary to order standard lengths as with threaded pipe.

Expansion and contraction are provided for in a welded pipe installation in the same manner as in a threaded system, similar loops and joints being used. These may be made to practically any desired shape and fabricated on the job from standard welded fittings and straight lengths of pipe.

A smoother inside surface, free from projecting pipe ends and the replacement of abruptly-bent threaded fittings by sweeping turns results in substantially less friction and turbulence in welded pipes. Increased efficiency in heating systems also results from the use of thin wall pipes. In water supply lines for domestic or municipal use welded pipe will deliver cleaner water at once, since no oil or joint compound is required, as in threaded lines.

Discussion

From the discussion of this report it was apparent that welding processes are finding wide application in the railroad field in the welding of pipes and fittings. Applications mentioned in the discussion include the welding of pipes in large switch heating installations, the welding together of old 90-lb. rails used in the construction of the frame for a new enginehouse, the repair of water service pipe lines and air lines in train yards, and the welding of wrought iron pipes. It was also brought out that many roads have made it a practice to include one or two welders in bridge and building gangs.

Types of Floors for Highway Bridges

A comprehensive report which went into considerable detail with respect to various designs of floors and the characteristics of different materials used in bridge-floor construction, and cited numerous examples of this construction, was presented by a committee of which T. H. Strate, division engineer, Chicago, Milwaukee, St. Paul & Pacific, was chairman. An abstract of the report follows:

The bridge engineer of today is confronted by many new problems arising by reason of modern high-speed and heavy-duty motor transportation. Old bridges built for lighter and slower traffic of the horse-and-buggy days must be altered to withstand the new traffic. New bridges must embody the latest ideas, among which is a deck combining light weight with great strength and resistance to water and skidding.

Where the entire bridge structure is of concrete, the floors are generally of reinforced slab construction, 6 to 8 in. in thickness, resulting in a dead weight of 100 to 125 lb. per sq. ft. The trend now seems to be towards a lighter type, but it must be conceded that a properly constructed concrete surface has its advantages—safety from fire, anti-skid qualities and a generally pleasing appearance.

Information concerning the use of bituminous wearing surfaces on concrete bridges is scarce. The Kansas City Southern reports a few bridges with slabs covered with 2½ in. of bituminous macadam which have been satisfactory under moderately heavy traffic and have required very little maintenance. Likewise, reports of concrete bridges with wearing surfaces of brick, asphalt plank or wood block do not indicate favorable consideration, principally due to the additional cost of the brick and the slipperiness and extra maintenance costs of the other two materials.

Wooden bridges naturally constitute a large percentage of the structures over tracks. For secondary roads where traffic is light, plank floors are satisfactory and with pneumatic tires the wear is not exeecessive. The old style of single flooring on wood joints presents difficulties in anchoring and direct wear on the planks. There does not seem to be much choice between pine and oak as to life, for the oak, while harder, seems to have a tendency to warp and splinter.

Some reports have been received also on the use of runways of steel plates, asphalt planks and grid armor on bridges with little traffic and generally one way. While they serve their purpose, we do not believe they warrant much attention. Only one report was received regarding the use of laminated floors on timber bridges. A report on the use of concrete slabs on timber bridges was also received, a two-inch sub-floor being installed, and this topped with a reinforced concrete slab seven inches thick at the center of the bridge and five inches thick at the edges.

The use of concrete slabs on steel girders is a popular type of construction. The advantages of such floors are (1) security against fire, (2) low maintenance cost of roadway, (3) lateral stiffness, (4) protection for the steel floor system and (5) attractive appearance and safety to traffic. Excessive vibration in a bridge is highly undesirable. A concrete floor adds greatly to lateral rigidity and reduces lateral vibration. A well-designed and constructed concrete bridge floor will, therefore, save part of the cost of the lower lateral bracing in a new bridge.

A concrete floor does not become water soaked and retain moisture in contact with the steel, to promote oxidation. It absorbs the greater portion of local shocks from traffic and thus reduces impact on the floor system. The appearance of a concrete floor is pleasing. It presents an even, hard but not slippery, surface, tends to reduce skidding and in general has all the well-known advantages of the concrete road.

A solid steel floor on an old 120-ft. through-truss highway bridge crossing the Pennsylvania-Reading Seashore Lines at Camden, N. J., consists of transverse interlocking 8-in. channels of copper-bearing steel laid with flanges alternately up and down and welded to stringers at intervals of about 6 in. Asphalt filler was packed in the alternate troughs thus formed and the entire roadway was paved with asphalt plank cemented to the alternating surfaces of steel and asphalt filler. For the sidewalks, two-inch creosoted planks were used. The advantages claimed for this type are a saving in dead load, this floor weighing about 50 lb. per sq. ft. and its adaptability to old steel bridges with wooden floors but which, with a small amount of strengthening, will be good for many years' service.

Another type of steel floor is a shallow construction consisting of a steel grid or grating welded to the bridge stringers and filled with concrete, the exposed top edges of the steel helping to take up the wear from the wheels. To provide a base for the concrete filling, the longitudinal bars may be welded on top

of a continuous steel plate. In other designs, thin steel plates rest upon and are welded to the flanges of the longitudinal bars of "I" or inverted T-sections, thus forming a base for the concrete. In still other designs, however, with bars of similar sections, the bars are laid with their bottom flanges in contact, so that the base plates are not required.

It may not be amiss to call attention to the question of corrosion by gases and smoke from engines, and the erosion by engine blast, of floors with exposed steel over the tracks, especially where the clearance above the smokestacks is limited. The same influences may cause deterioration of concrete and eventual exposure and corrosion of the reinforcing steel. With wood flooring, there is the liability of fire caused by sparks in the engine blast. This suggests the advisability or economy of blast plates under the bridge floor as a protection from both corrosion and erosion and fire hazard.

Tests of impending skid have shown that concrete has the highest anti-skid values of any type for speeds of 40 miles per hour and greater. The significant feature of the tests on concrete surfaces, wet or dry, was the uniformity in the results. Co-efficients for smooth-textured concrete were generally lower than for coarse-textured concrete. The Portland Cement Association has stated that the anti-skid values of wet concrete, which like all other wet surfaces are lower than for the dry surfaces, are high enough to permit driving on a curve of 1,000 ft. radius at 75 miles an hour.

Because of the abrasive action of traffic, steel plates acquire a polished surface that offers little resistance to skidding when wet. Wood planks absorb a large percentage of water near the surface, and it is not possible to squeeze all the water out between the tire and the plank. Under these conditions the water has a greater lubricating effect on wood plank than on certain other surfaces. The tests on asphalt plank indicated that the co-efficients for the mineral-surface plank installations were notably higher than for any of the other installations. In fact, the co-efficients for this surface when wet were slightly higher than the co-efficients obtained on the three Portland cement concrete surfaces tested wet. The anti-skid values of bituminous-type roads are very low where the bituminous material "bleeds" or where such a fat mixture has been used as to fill all surface voids completely.

The cost of maintaining the various types of wearing surfaces on bridges is an important item, but is more or less indeterminate unless the supporting structure is of sufficient rigidity to make the entire construction comparable with the roadway off the bridge. There is no doubting the fact that the largest single factor in causing surface failures in bridge floors is the vibration or movement of the structure under traffic. It is obvious that a comparison of two identical floor constructions, one on a rigid structure and the other on a non-rigid structure cannot be made fairly.

Discussion

In the discussion of this report a composite type of bridge floor was described, which involves the use of a concrete wearing surface laid over a laminated floor. In this type of floor a bond between the concrete and the laminated portion of the floor is provided by using two widths of timbers in the laminated portion, which are placed alternately in such a manner as to provide longitudinal grooves. Another type of bridge floor was described which consists of concrete made with a lightweight aggregate and reinforced by means of welded steel trusses about 6 in. high which are welded to the stringers. In a discussion of laminated bridge floors it was brought out that 3-in. by 6-in. timbers are most satisfactory as smaller sizes are too light for this type of construction.

Different Types of Pumping Equipment

The report of the Committee on the Relative Merits of Different Types of Pumping Equipment and the Conditions under which Each Is Most Suitable, contained a review of the general types of pumps: Reciprocating, centrifugal and rotary pumps, and air lifts. The different power units for driving these pumps were also described, and the various conditions of pumping head were discussed. An abstract of the report, which was presented by the chairman, C. R. Knowles, superintendent of water service, Illinois Central, follows:

Reciproacting pumps represent the earliest type and are used more extensively than any others. While the centrifugal pump is a more recent development, it is rapidly replacing the reciprocating pump for new installations. The air lift is used under certain conditions for pumping from deep wells. While it is less efficient than any other type of pumping equipment, there are conditions where its advantages offset the lower efficiency, as for example, in very deep wells with an extremely high lift, in wells that were not drilled perfectly straight and for water containing considerable grit or sand. A lift of 400 ft. is not at all uncommon in certain parts of the West, and in individual cases these lifts are as high as 900 ft. Under these conditions the overall efficiency and economy of the air lift compare favorably with other pumping equipment. In fact, there is a question whether either a turbine or a reciprocating pump could be operated successfully with a pumping head 800 or 900 ft. below the surface. The rotary pump has not been used extensively in railroad service, although it is coming into use in the smaller sizes for pumping chemicals used in wayside treatment.

The changes in the power units used to drive pumps have been quite as revolutionary as the changes in the design of the pumps themselves. At the beginning of the century pumps at railway water stations were driven almost exclusively by steam. For a time, gasoline engines were installed in place of many steam plants, but they were subsequently superseded by the semi-Diesel oil engine, which is still used extensively at railway water stations. The wide extension of power lines and reductions in the cost of electric current have made it possible to install many electric-driven pumps, replacing both steam and oil to a large extent.

The electric motor may be operated with little attendance other than an occasional inspection and oiling. The maintenance costs are also much lower than for either the oil engine or the steam pump and boiler. The control may be manual, push-button or automatic. Where push-button or automatic control is used, either alone or in combination, such control may be entirely remote from the pumping unit itself and, if desired, may be located several miles away.

The relative efficiency of the different types of pumping equipment is of chief importance when comparing pumps of the same type, as, for example, one centrifugal pump with another. This is because the selection of any particular type of pump will, as a rule, depend upon local conditions rather than upon the efficiency of the various types. For example, at terminals where electricity is available the demand charge is usually negligible, and the rate for current relatively low, while if steam is readily available steam operation will probably prove more economical. In the absence of either steam or electricity at isolated points, internal-combustion engines are probably more desirable.

The most satisfactory type of pump installation to be used in a given case can best be determined by a careful study of local conditions and estimates of the power cost, the cost of operation and maintenance, and the interest and depreciation on the total investment.

Underwater Inspection

The report of the Committee on Underwater Inspection and Examination of Railroad Structures, which was presented by the chairman, W. R. Ganser, master carpenter, Pennsylvania, Camden, N. J., was confined principally to methods for making underwater inspections of bridge substructures. The question of piling in tidewater to support piers and docks was disposed of briefly by explaining how the presence of marine borers and internal decay can best be detected by either pulling a few piles and cutting them in sections, by striking them in place with a hammer or by taking increment borings. Other parts of the report are abstracted briefly as follows:

Bridge foundations fail from various causes. In the majority of cases, failures have been due to flood or other unusual water conditions and, unquestionably, many of them could not have been

averted by any system or program of inspection. There are few cases on record where foundations have failed as the result of natural scour over a long period of time, for such scour is usually detected during periodic bridge inspections and measures are taken to correct it or to offset any damaging effect that it may have. Failure to keep water courses free from tree stumps or rubbish, which block the normal course of water and divert it so that it undermines or washes away back or wingwalls, are not unusual. Frequently, such foundation failures allow the entire structure to collapse.

It is necessary to keep water courses clear at all times, particularly pipe culverts, as they may have been designed to carry off normal rainfall, but not the unusual storm or flood conditions which occur perhaps once in 25 years. The stoppage of a pipe culvert will often raise the water above the pipe to such an extent that the head will either force the water beneath the pipe, or cause it to cut away the fill surrounding it and result in a washout. Masonry as well as pile foundations have failed because rivers or streams have been dredged to give a greater depth of water, causing high and fast water resulting from storms to scour away more of the bottom and allow a structure to fail.

Pile foundations generally fail as the result of decay or the ravages of marine borers, both of which have been greatly reduced by the use of treated material, although there are cases on record where marine borers have weakened or destroyed treated piling. Stone masonry, even if on a firm foundation, may fail if the mortar or pointing is washed out, allowing the structure to stand with no bond between courses.

Slight settlement of the track over a structure and cracks in the masonry substructure are sometimes indications of weakness in or approaching danger to a bridge foundation, although not invariably. Masonry will, at times, show slight settlement and cracks due to changes in temperature, but these do not necessarily impair the strength of the structure, or indicate a weakened foundation. An alert inspector should detect all such possible indications of weakness and follow them up closely to see that they do not develop into a dangerous condition.

Responses received from practically all of the roads voice the opinion that periodic underwater inspection of structures is necessary, although a few expressed the belief that such inspection is necessary only after storm periods. The frequency of inspections regarded as necessary varied from as often as once a month to once a year, but all the reports are in agreement as to the need for special inspections immediately following severe storms. The type of inspection referred to, which has to do only with those parts of structures under water, should not be confused with regular bridge inspections, although these latter inspections very often disclose conditions in underwater structures which require immediate attention.

Responsibility

The responsibility for the safe condition of a structure rests primarily with the division engineer and the bridge and building supervisor or master carpenter. Every railroad has rules for the periodical inspection of structures, but, because of the difficulty of making underwater inspections, special programs are frequently necessary. These special programs are, in most cases, under the direction of the system chief or bridge engineer and are carried out by division forces under system supervision.

Our investigation shows that few railroads have complete and accurate "as built" plans of all of their bridges. The majority have such plans for structures built during the last 25 years or so, but, apparently, when structures older than this were built, the necessity for such plans was not universally recognized.

Too much stress cannot be placed upon the importance of the careful preparation of "as built" plans for all structures, and the desirability of ascertaining the true condition of foundations of those structures for which such plans are not available. With such records at hand, and only with such records, can the engineer know, beyond doubt, whether he can depend upon his foundations to support his structures adequately in times of unusual conditions.

The most common methods of inspection include sounding with a weighted line, or with a rod or pipe, the use of a licensed diver, and the construction of cofferdams to permit the dry inspection of foundations. Soundings are used universally, primarily to determine the relative levels of the bottom of a stream or body of water and the bridge foundation, and may be made with various types of equipment. Divers are employed to secure information at places where soundings or probings are not feasible or where some concern exists as to the condition of foundations, and the true condition cannot be determined readily in any other manner. Cofferdams, because of the expense which they involve, have not been used to any extent in inspection work, except in rare cases where very fast water is encountered or where the engineer is almost certain that repairs will have to be made upon the completion of the investigation.

One of the most important phases of any inspection work is the establishment of a satisfactory method of compiling and recording the information secured. This is important not alone because it provides a permanent, accurate record, but also because it permits subsequent data to be compared most conveniently and effectively with those obtained earlier. There is considerable variance in the manner in which the different roads record inspection data. Some use permanent notebooks, while others use a card index system or special inspection form on tracing cloth and blueprint paper.

Discussion

The discussion turned largely to the necessity for knowing that the construction of highway bridges, particularly above existing railway structures, is not such as to endanger the stability of the substructure in the railway bridge. One case was cited where almost immediately following the construction of a new highway, 60 railway bridges were washed out, many of which had been in service since 1869.

In discussing the damage done to piers and abutments by the floors during the current year, one road reported that all piers and abutments where scour had occurred below the footings during these floods had been protected by enclosing them in sheet piling and then constructing curtain walls of concrete placed by means of tremies to a considerable depth below the original footing. On another road the foundations of all bridges on the system have been examined, even where it was necessary to construct expensive cofferdams in order to uncover the foundations. The Canadian National, which has made an extensive investigation of the condition of the foundations on its Central region, has found that some of the worst conditions were in streams that were subject to very slight fluctuations between high and low water, and that in most cases the trouble had occurred by reason of the construction of highway bridges above the railway structure or by other obstructions in the stream which had deflected the current from its normal course.

L. & N. Exchanges Tickets For Newspaper Advertising

THE Louisville & Nashville has recently inaugurated a plan for institutional advertising in newspapers along its lines in the three states in which it has its largest mileage, under which compensation is made, not in cash, but in the form of scrip books, good for intrastate transportation. In Kentucky and Tennessee the scrip is available for any employee of the newspaper, or members of families of employees; but in Alabama the use of the transportation is restricted to the editor and the publisher of the paper. The laws of these three states permit such an exchange under the conditions named.

Contracts for this advertising are made at each paper's regular rates, cover a period of one year, and contemplate the insertion of one 20-inch advertisement a month during that period. To avoid conflict with the company's regular passenger advertising in the same papers,

which is being continued as before on a cash basis by the passenger department, the institutional campaign is being handled and the advertisements prepared by Thomas E. Owen, editor, L. & N. Employees' Magazine.

The plan has been accepted to date by about 80 per cent of the newspapers in L. & N. territory in Kentucky (83 papers in all), and by a smaller number in Tennessee and Alabama. The accompanying illustration shows one of the advertisements in the series arranged for under this plan.

Railway Buying Big Factor in Industrial Market

(*Continued from page 574*)

of the larger roads averaged $2,800 per mile and took 17.2 per cent of each revenue dollar, while the total purchases of the smaller roads averaged $2,600 per mile and took 18.5 cents of each revenue dollar. Excluding fuel, the purchases of the large roads averaged $1,780 per mile and 11.2 per cent of operating revenues, and those of the smaller roads averaged $1,670 per mile and 11.8 per cent of operating revenues; while the miscellaneous purchases of the large roads averaged $1,490 per mile and 9.4 per cent of operating revenues, and of the small roads averaged $1,370 per mile and 9.7 per cent of revenues. The differences are not great, but, in general, the purchases of the smaller roads in 1934 were less per mile but proportionately higher in terms of available revenue than those of the larger roads.

Even more interesting than speculation as to the relation of purchases of large and small roads is the status, in the purchasing picture, of roads involved in receivership or other forms of financial re-organization, especially at this period. While such roads do not have sufficient funds or credit to meet all their obligations, particularly when faced with the problem of refunding large bond issues, it does not follow, as is sometimes supposed, that they have ceased to buy materials and supplies. On the contrary, the demand for materials continues and since the value of a road to creditors is contingent upon its operation, insolvency often permits a larger volume of expenditures for necessary supplies than is permitted on roads which have severly throttled the outlays for materials and supplies to pay interest on bonds. The extent to which this is true is shown by comparing the expenditures of all railroads with those of 14 railroads operating 39,000 miles of line which were in the hands of receivers or trustees in 1934. Total purchases for these latter roads averaged $1,790 per mile and took 25.5 cents of each revenue dollar, as compared with $2,500 per mile and 17.8 cents of each revenue dollar for all roads. Total purchases less fuel averaged $1,300 per mile and 18.4 per cent of operating revenues, as compared with $1,600 per mile and 11.6 cents for the United States. Miscellaneous purchases were $1,040 per mile and 14.8 per cent of operating revenues, as compared with $1,320 per mile and 9.7 per cent of operating revenues. While purchases were less per mile on the roads operated under receivers or trustees, they represented almost 50 per cent larger outlays from operating revenues than the all-railroad average.

Freight Car Loading

(*Continued from page 574*)

week and 56,873 cars for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
October 19, 1935	56,285	22,736
October 12, 1935	58,571	22,049
October 5, 1935	58,364	22,962
October 20, 1934	56,873	19,663
Cumulative Totals for Canada:		
October 19, 1935	1,889,968	891,522
October 20, 1934	1,860,693	906,255
October 21, 1933	1,606,628	771,757

Communications and Books . . .

Truck Traffic Volume Inadequate As Gage of Highway Competition

NEW YORK

TO THE EDITOR:

I read with interest the articles in *Railway Age* of September 21 and 28 in which John Leeds Kerr, addressing investors primarily, shows that the sharp decline in railroad freight traffic since 1929 was due primarily to the atrophy of our heavy industries and not, as commonly believed, to the competition of such new transportation agencies as motor vehicles, pipe lines and others. Colonel Ayres, in the October Bulletin of the Cleveland Trust Company, writes in similar vein.

While this argument is undoubtedly valid and interesting, if we look at carloadings solely as a business indicator, nevertheless it omits consideration of how the investor has been affected by another factor, that is the influence of this competition on the railroad rate structure. This, as I see it, is the important phase of the picture. The effect of truck competition on the earning power of the railroads cannot be gauged solely by the volume of traffic diverted to trucks. I know of many cases where rates had to be reduced sharply under the threat of this competition.

General truths, however, cannot be established by quoting instances. But Mr. Kerr, in this article, supplies some figures which throw some interesting light on this question. He gives the revenues per ton-mile since 1929 as follows:

Revenues per Ton-Mile

1929	$.01076
1930	.01063
1931	.01051
1932	.01046
1933	.00997
1934	.00978

Moreover, he emphasizes repeatedly that the railroads lost during this depression primarily the traffic in bulky raw materials and not in finished consumers' goods. Since the former carry relatively low rates, their loss, with a stable general rate level, should result in higher average revenues per ton-mile for the remaining tonnage. Since revenues per ton-mile declined by 9.1 per cent despite this fact, must we not conclude that the rate structure has suffered substantially in recent years? I maintain that the main cause of this decline was the competition of trucks, pipe lines, etc.

Mr. Kerr also fails to mention the loss of passenger traffic due to the advent of the motor vehicle. Since 1920 passenger revenues of Class I railways declined by $942,000,000 to $346,000,000 in 1934. The importance of this development is often overlooked by security analysts. I calculated some time ago the effect of the diversion of passenger traffic upon the earnings of the St. Louis-San Francisco. I found that this diversion reduced net railway operating income between 1923 and 1931 by $10,526,000. The importance of this decline will be realized when it is compared with fixed charges of $13,500,000. I do not think it makes much difference to the investor, if the railroad he has a stake in loses a dollar of earnings, whether that loss occurs in the passenger department or in the freight department.

Well informed investors, knowing the real influence of this competition, have refused to take an alarmist view. They know that the railroads can mitigate the effects of it by greater efficiency and the elimination of many wastes. But any discussion belittling competition of trucks, pipe lines, etc., with the argument that they take little if any tonnage away from the railroad misses the point which interests investors most.

ANALYST.

New Books

Rail Motor Cars (L'Autorail). Published by La Revue Petrolifere, 23 Rue de Constantinople, Paris. 150 pages, 9½ in. by 12¾ in. Price, 250 francs.

This is a special issue of Le Revue Petrolifere devoted to information on rail motor cars driven by internal combustion engines and having mechanical or electrical transmissions. It should be of particular interest to anyone desiring information on the important development which has taken place recently in this field on European railroads. The illustrations, both halftone and line, are remarkably complete. There are chapters on the historical development of cars and engines, with particular attention to Diesel motors. Subjects such as the aerodynamic problems of streamlining, braking, transmission, lubrication, running gear, and light-weight construction are given attention. Following descriptions of the cars of various builders on the different roads in France information is given on the cars employed in Germany, England, Italy, Switzerland and in other countries.

Income and Economic Progress, by Harold G. Moulton. 191 pages, 8 in. by 5¼ in. Illustrated with charts. Bound in cloth. Published by the Brookings Institution, Washington, D. C. Price $2.

In this final volume of the Brookings Institution's four-part study of the distribution of wealth and income in relation to economic progress, Dr. Moulton recognizes that "all the world loves a panacea," but nevertheless fails to evolve a "brain trust" solution for our economic ills. In other words the author has learned, as have others "broadly experienced in the actual operation of our business world or professionally trained in the study of social organisms," that "there is no single formula by which desired results can be brought about . . . sound proposals for a better system for the distribution of income cannot be over-simplified."

Thus, despite the currency of novel economic theories, the studies of Dr. Moulton and his associates have pointed the way—or at least the main line—to economic progress in a return to first principles of the capitalistic system. Real economic progress, it is emphasized, comes with improved production and distribution methods which permit an ever-increasing flow of goods to all the people. This is orthodox economics but it is not the economics of the 'Twenties when price stabilization and tariff policies, cartels and other barriers attempted to underwrite then-existing enterprises, thereby suspending the true functioning of the capitalistic system by interfering with the process of "disseminating the benefits of technological progress through persistent reductions in prices."

This method of distributing income (i. e., real income or commodities) through price reductions, based in technological progress and not in wage cuts, etc., is hailed as the best route to general economic well-being after an examination of other such alternatives as distributing the wealth, use of the taxation powers and raising money wages. The first is no answer when there is insufficient wealth to distribute; and while the latter two are possibilities as minor elements, their benefits reach only special classes directly involved and "unlike price reductions, the benefits do not extend to the entire population, and hence tend to produce maladjustments between different divisions of the economic organization."

No attempt is made in the book to set forth details of the price program outlined but the author sets up the findings of himself and his associates in that connection as "an open challenge to the business men of America." Perhaps a "new frontier" is ahead if capital resources, unhampered by restrictive policies of the post-war period, are put to work, placing "the old common necessities of food and clothes and housing within reach of the millions who are now underfed, ill-clad and housed only in the tenement of the city slum or the shack of the country slum."

The three previous volumes of the present series—America's Capacity to Produce, America's Capacity to Consume, and The Formation of Capital—were reviewed respectively in the *Railway Age* issues of September 22, 1934, October 6, 1934, and April 20, 1935. While the present work completes the series, and the "statement of preliminary findings," the Brookings Institution does not regard it as "in any sense a valedictory"—its conclusions "serve merely to point lines of attack and suggest the scope and direction of more comprehensive and intensive studies which should follow."

NEWS

I. C. C. Asks Information from Protective Groups

New rules govern committees applying for authority to act in Section 77 proceedings

The Interstate Commerce Commission this week issued a voluminous series of special rules of procedure to govern applications made to it under Section 77 of the bankruptcy act by protective committees or others for authority to solicit, use, employ, or act under proxies, authorizations, or deposit agreements in connection with railroad bankruptcy and receivership proceedings.

Any person seeking authority (a) to solicit, or permit the use of his name to solicit, from any creditor or shareholder of a railroad corporation by or against which proceedings under Section 77 of the bankruptcy act, or against which receivership proceedings have been instituted and are pending, any proxy, or authorization to represent or act for such creditor or stockholder in such proceedings or in any matters relating to such proceedings, or (b) to solicit the deposit by any such creditor or shareholder of his claim against or interest in such railroad corporation, or any instrument evidencing the same, under any agreement authorizing such representation or action for such depositor, or to act under such agreement, or (c) to use, employ, or act under or pursuant to any such proxy, authorization, or deposit agreement, which has been solicited or obtained prior to the institution of such proceedings, is required to make application for authority, and such application shall, unless otherwise authorized by the Commission, be filed sufficiently in advance to give the commission reasonable time, not less than 30 days, for the consideration and hearing required by law. The information to be furnished with such application is specified in detail.

If the application is by any person other than an individual, the applicant shall, in addition to furnishing the information as to itself required by paragraph 9, attach a statement or statements under oath by each of its members, its secretary, and counsel, or by each of its officers, directors, and principal stockholders (not more than 20), as may be appropriate, setting forth for each individual so connected with the applicant such information as to his connections, securities, ownership, purchase and sale of securities, and terms and provisions of contracts, as is required of the applicant.

Oklahoma State Rates Found Not Discriminatory

The Interstate Commerce Commission has issued a report finding that the failure or refusal of the Corporation Commission of Oklahoma to authorize or permit increases in certain intra-state freight rates corresponding to the emergency increases authorized by the federal commission in Ex Parte No. 115 has not been shown to result in undue discrimination against interstate commerce. The report says that the railroads introduced very little affirmative evidence and that many of the rates involved had been reduced by more than the amount of the emergency charges so that the action of the Oklahoma commission did not prevent the roads from adding the interstate emergency charges to such rates on September 25.

The similar proceeding as to Kentucky state rates has been discontinued because the Kentucky commission has authorized increases similar to those made in interstate rates.

New Railroad Retirement Board Appointed

President Roosevelt on October 30 announced the appointment of the members of the new Railroad Retirement Board provided for in the railroad pension act passed by Congress in August—Murray W. Latimer, chairman; James A. Dailey, and Lee M. Eddy. Mr. Latimer was chairman of the board created under the former pension law, that was declared unconstitutional by the Supreme Court of the United States last May. Mr. Eddy was also a member of the former board, having been nominated by the railroad labor organizations, and Mr. Dailey, who has been secretary of the board of pensions of the New York Central Lines, was nominated by the railroads. He takes the place of John T. Williamson, chairman of the pension board of the Chicago, Burlington & Quincy, who was the railroad representative on the old board. The President has not yet announced the appointment of the special commission which was to make a report to Congress by January 1 as to what would be a sound pension system.

Traveling Passenger Agents

The American Association of Traveling Passenger Agents, at its recent annual meeting, elected for the ensuing year the following officers: President, Leonard J. Pohlman (C. P.), New York; vice-president, David B. Steeg (Penn.), Kansas City, Mo.; secretary, C. A. Melin (Nickel Plate), New York.

Public Relations No Job For Lawyers Say Shippers

Pacific coast board protests C.S.D. district office closing—See shippers vital in politics

Scott F. Ennis, chairman of the Pacific Coast Regional Advisory Board, has made public a letter from H. R. Higgins, chairman of the legislative committee of the board, protesting against the proposed abolition of the district offices of the Car Service Division of the A.A.R. This letter Mr. Ennis has transmitted to J. J. Pelley, president of the A.A.R., with the statement that the views of Mr. Higgins are not only his own but those of "the majority of our shipper membership" as well.

"As an executive of one of the largest producing and shipping organizations on the Pacific Coast and a former railroad man," Mr. Higgins writes, "I can and do sympathize with the Association in its efforts to curtail operating expenses, which I understand is the immediate objective. It is not the wisdom of the purpose we question, but the advisability of prostrating an agency that has, in my opinion, done more to effect clear and constructive thinking among shippers in connection with problems that face the railroads than any other instrumentality created by them. I take the liberty of citing two illustrations of the effectiveness of these district agencies, which typify others:

"Until recent years shippers on this coast have not had a clear understanding of the economies that accrue to the railroads when we co-operate with them in loading cars to conform to certain recommended practices; we had only an occasional suggestion that these practices promote efficiency and accelerate car relocation plans; our view was more or less local, and attitude apathetic. But now our perspective of these recommended practices is both local and national in scope; we are familiar with the costs and effects of empty car mileage; we know that in seasons we should endeavor to load certain types of cars to granger regions; likewise automobile cars to states producing the traffic for which these cars are especially constructed. We are not permitted to forget these things, and consequently our attitude has changed from apathy to that of co-operation.

"I have been privileged to serve for the past two years as chairman of your Legislative Committee. I have found the district manager of the Association of invaluable assistance in defining the consequences of

proposed bills. He has placed before me, for the benefit of our committee, clear and concise memorandums which have clarified doubtful views and enabled the committee to expedite its work. I do not know where else we could have obtained much of this information and material. The value of the immediate availability of this service cannot be estimated.

"Before leaving the subject of legislation, I wish to remind you of the opinion of two prominent railroad executives expressed at a recent luncheon meeting, that the railroads should re-enter politics, with the Association as the spearhead. By this statement I inferred that, if railroads are to re-enter the political arena, they should profit by the experiences of the past when political problems of the roads were handled exclusively by well-paid lawyers, whose ability and integrity is not in question, and who in administering the political policies of the railroads of the period around 1910 may have done a good job. It was the plan that was wrong. It created a wall of resistance against certain demands of the public. This resistance started a fight *which was used by the demagogue as a stepping-stone to public office. In time this type predominated and the railroads were soundly beaten politically.*

"If they are to re-enter politics it should not be through a complement of high-powered, combative attorneys. *If they do they will again accommodate the aspirations of the demagogue, and government ownership will become inevitable.* If they are to re-enter politics, it should be through an expansion and improvement of the plan inaugurated in 1923 when the first shippers' advisory board was established. This plan recognizes that the interests of the public and the railroads are inseparable. As you have said, *between the shippers on the one hand and the railroads on the other there should be and is a feeling of partnership, but this feeling is not more than half developed. To that extent its influence is also limited.*

"The success this advisory plan has enjoyed is due in a large measure to the fact that the Car Service Division has wisely decentralized its functions by establishing district offices throughout the country. These district representatives have unconsciously—unintentionally—become invaluable political assets, in the proper sense, in favor of both shippers and railroads. This has been accomplished, not by resisting adverse political influences, but by eliminating prejudices caused by a misinformed public. In the fact that they represent a service organization and their activities have not and should not be regarded as political, rests the value of their influence. They present and explain the consequences of involved measures in language that shippers understand."

N.Y.C. Plans New Florida Train

A new train, the Florida Sunbeam, offering fast service to Florida, with sections from Chicago, Detroit, Mich., and Cleveland, Ohio, will be put into service by the New York Central on January 1. The new train will be made up exclusively of air-conditioned cars and its schedule will be arranged to offer convenient forenoon arrivals the second morning after leaving, in both east and west coast cities of Florida. It will be operated in conjunction with the Southern and the Seaboard Air Line.

Sale of Liquor Banned on Mexican Trains

The National Railways of Mexico have issued instructions prohibiting the sale of liquor and beer on board passenger trains and on railroad premises, including hotels and restaurants.

Mexican Lines Improving Second Class Service

A program for improving accommodations for poorer people traveling by railroad is being undertaken by the National Railways of Mexico. As the first step, second-class passenger coaches are being modernized and repaired.

North Western Extends Low Cost Meals

The Chicago & North Western as a result of the general acceptance by the public of low priced meals, porter service and free pillows in the coaches of the Los Angeles Limited, the Columbine, the Pacific Limited, the Portland Rose and the Mountain Bluebird, has extended the service to the coaches of the Corn King Limited, operating between Chicago and Omaha, Neb., and Sioux City, Iowa; and also the Ashland Limited, operating between Chicago and Ashland, Wis.

Wage Statistics For August

Class I railroads, excluding switching and terminal companies, have reported to the Interstate Commerce Commission a total of 1,011,030 employees as of the middle of August. The total compensation was $141,341,612. The number was 21,111, or 2.05 per cent, less than the number reported for August, 1934. The total number of hours paid for was 1.43 per cent less and the total compensation 5.91 per cent greater than in August, 1934, reflecting the higher basis of wages in 1935. The total number of employees who received pay during the month was 1,131,478, a decrease of 16,539 as compared with August, 1934.

New Equipment

Class I railroads in the first nine months of 1935 installed 3,172 new freight cars, according to reports received by the Association of American Railroads. In the same period last year 19,109 new freight cars were placed in service, and in the same period two years ago there were 1,872. Twenty-eight new steam locomotives and 101 new electric locomotives were placed in service in the first nine months of this year. The railroads in the first nine months of 1934 installed 14 new steam locomotives and 12 new electric locomotives.

New freight cars on order on October 1 totaled 7,441, compared with 5,495 on the same day in 1934 and 275 on the same day in 1933. The railroads on October 1 this year had on order 14 new steam locomotives and 3 new electric locomotives. New steam locomotives on order on October 1, 1934, totaled 37, and on the same date in 1933 there was 1. New electric locomotives on order on October 1, 1934, totaled 104. No reports are available as to the number on order on October 1, 1933. Freight cars and locomotives leased or otherwise acquired are not included in the above figures.

Labor Organizations to Campaign for Government Ownership

The Railway Labor Executives' Association, comprising the heads of the 21 so-called "standard" railroad labor organizations, which at a meeting in Washington this summer adopted resolutions advocating government ownership of railroads, has established an office in Washington at headquarters of the organizations in the "Labor" building for the purpose of conducting a campaign at the coming session of Congress. The office is under the direction of Arthur Keep, for several years editor of the Railroad Telegraphers' Journal, who, it is reported, will have charge of the dissemination of "information" in connection with the campaign.

Overnight San Francisco-Los Angeles Freight Service

The Southern Pacific, on October 22, established "The Overnight," a fast merchandise train, to provide first-morning delivery of l.c.l. shipments between San Francisco Bay cities and Los Angeles, Cal. The train leaves San Francisco and Oakland after the regular evening closing hour and arrives in Los Angeles, 471 miles, at 8:10 the next morning. Returning, the train leaves Los Angeles after the regular evening closing hour and arrives at San Francisco at 8:45 a.m. and in Oakland at 9:17 a.m. Store door pick-up and delivery by the Pacific Motor Transport Company is furnished in connection with this service.

Rehearing in Power Reverse Gear Case

A rehearing in the case in which the Interstate Commerce Commission ordered the railroads to equip their locomotives with power reverse gear, but the order was set aside by the courts as invalid, was begun at Washington on October 29. The Supreme Court of the United States held that the commission had not made findings as to the need for such equipment from a safety standpoint sufficient to bring its order within the scope of its authority under the safety appliance acts and the case was re-opened at the request of the Brotherhood of Locomotive Engineers. At the re-opened hearing additional testimony was presented by brotherhood witnesses as to accidents said to have been caused in the use of manual reverse gear.

Dailey Appointed to Retirement Board

James A. Dailey, secretary of the New York Central board of pensions, has been appointed a member of the Railroad Retirement Board. Mr. Dailey was born at Ossining, N. Y., April 3, 1894. He entered the service of the New York Central on April 23, 1911, as secretary to the general claims attorney. Early in 1920 he was appointed chief clerk to the general

claims attorney and since 1923 has been identified with the work of the pension bureau, having been appointed secretary of the pension bureau and board of pensions on March 1, 1925. He has had extensive experience in connection with pension plans in general and especially with the New York Central system plan which has been submitted to extensive study for a number of years.

Trespassing a Serious Problem

That trespassing on railroad property is a serious problem is again shown in a study made by the Safety Section of the Association of American Railroads. During the month of September, the 7,000 patrolmen, watchmen, lieutenants, sergeants and police employed by the 69 major railways ejected 537,355 persons from railroad properties, not including those arrested as illegal train riders or trespassers. The record shows 530,099 in May; 635,307 in June; 674,151 in July, and 659,856 in August. The decrease in August and September, as compared with July, may be attributed to the fact that the transient camps conducted by the government throughout the country were closed to newcomers on September 20, and to the fact that the vacation period was approaching its end.

Figures for individual lines indicate that some railroads are more susceptible to trespassers or that they are policing their properties more thoroughly. The greatest number of persons ejected by one railroad was 69,102 in May; 87,265 in June; 88,571 in July; 91,507 in August; and 78,991 in September, as compared with an average for all railroads of 8,283 in May; 9,626 in June; 10,215 in July; 9,846 in August; and 7,788 in September.

Yucatan Railways Turned Over to Employees

The United Railways of Yucatan have been turned over to its workers for management, following a dispute involving wages and working conditions. The Union of Railroad Workers called a strike on October 2 and following several unsuccessful meetings with stockholders, the government of Yucatan intervened and decided that the road should be turned over to the workers. Under the arrangement, stockholders will be at liberty to elect commissioners but the labor union will appoint the members of the board of directors, the director, the treasurer, the superintendent of shops and other officers whom the union may designate. The government of Yucatan reserves the right to make any suggestions it may deem advisable to the board of directors. The arrangement will continue until the new management decides whether the demands of the workers are justified.

The controversy arose when the railways laid off employees and reduced wages due to a lack of traffic and insufficient earnings. The employees demanded payment of overtime and also allowances for Sundays, even though they do not work, in accordance with the labor law now in effect. The workers claimed that the financial situation of the road is due to inefficient administration.

The United Railways of Yucatan consist of 899 kilometers of lines within the states of Yucatan and Campeche, and were controlled by the stockholders although the government of Yucatan holds more than 50 per cent of the stock.

Dr. Durand Awarded John Fritz Medal

Dr. William Frederick Durand has been awarded the John Fritz gold medal for 1936 for notable achievement "as authority in hydrodynamic and aerodynamic science, and in its practical application; outstanding leader in research and in engineering education." Dr. Durand is professor emeritus of mechanical engineering of Stanford University, California. He was awarded the Daniel Guggenheim medal for aeronautical achievement in May, 1935, and is a past president of The American Society of Mechanical Engineers. He was one of the first men to engage in scientific research in aeronautics. In 1914 he joined with other men interested in aviation in organizing the National Advisory Committee for Aeronautics, authorized by Congress, and became its chairman in 1916. In 1925 he was appointed by President Coolidge a member and secretary of the Aircraft Board, of which the late Dwight W. Morrow was chairman. He has frequently served as consultant to the United States government on projects of the Bureau of Reclamation, particularly the Boulder Canyon project, the Grand Coulee project and the All-American canal near the Mexican border. In March, 1935, he was appointed by President Roosevelt chairman of a committee of review of the entire question of airship design and construction for the U. S. Navy.

8-Months Deficit $80,292,512; Only 13 Large Roads Cover Charges

Class I railroads for the first eight months of 1935 had a net deficit of $80,292,512 after deduction of fixed charges and after depreciation and retirements, as compared with a deficit of $32,724,356 in the corresponding period of last year, according to the Interstate Commerce Commission's monthly compilation of selected income and balance-sheet items. For the

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 143 Reports (Form IBS) Representing 149 Steam Railways

TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of August 1935	For the month of August 1934	*Income Items*	For the eight months of 1935	For the eight months of 1934
$42,074,127	$40,563,986	1. Net railway operating income	$263,738,344	$302,872,278
11,648,869	12,889,800	2. Other income	104,531,265	116,532,964
53,722,996	53,453,786	3. Total income	368,269,609	419,405,242
1,309,735	1,446,575	4. Miscellaneous deductions from income	11,577,654	13,902,213
52,413,261	52,007,211	5. Income available for fixed charges	356,691,955	405,503,029
		6. Fixed charges:		
11,313,775	11,175,853	6-01. Rent for leased roads	88,610,938	89,022,203
42,143,090	42,416,964	6-02. Interest deductions	338,559,439	339,221,596
223,570	241,291	6-03. Other deductions	1,794,236	1,964,188
53,680,435	53,834,108	6-04. Total fixed charges	428,964,613	430,207,987
§ 1,267,174	§ 1,826,897	7. Income after fixed charges	§ 72,272,658	§ 24,704,958
1,000,303	1,000,212	8. Contingent charges	8,019,854	8,019,398
§ 2,267,477	§ 2,827,109	9. Net income†	§ 80,292,512	§ 32,724,356
16,127,430	16,138,946	10. Depreciation and retirements	128,931,662	127,242,356
1,439,088	1,302,923	11. Federal income taxes	10,602,154	10,802,309
		12. Dividend appropriations:		
11,914,207	12,732,191	12-01. On common stock	53,049,573	65,550,052
2,505,336	3,756,765	12-02. On preferred stock	11,615,908	13,082,675

Selected Asset Items	Balance at end of August 1935	Balance at end of August 1934
13. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$735,865,124	$757,517,081
14. Cash	$372,128,009	$300,867,499
15. Demand loans and deposits	14,673,088	40,177,869
16. Time drafts and deposits	30,104,981	43,931,757
17. Special deposits	52,287,595	47,828,549
18. Loans and bills receivable	4,086,330	6,215,928
19. Traffic and car-service balances receivable	50,536,022	49,535,961
20. Net balance receivable from agents and conductors	43,926,034	42,813,886
21. Miscellaneous accounts receivable	132,781,672	146,796,943
22. Materials and supplies	293,166,326	310,332,740
23. Interest and dividends receivable	34,546,111	43,113,039
24. Rents receivable	2,756,564	3,390,236
25. Other current assets	4,264,973	4,080,437
26. Total current assets (items 14 to 25)	$1,035,257,705	$1,039,084,844
Selected Liability Items		
27. Funded debt maturing within 6 months*	$185,967,924	$77,501,887
28. Loans and bills payable‡	$343,799,984	$297,664,436
29. Traffic and car-service balances payable	67,051,090	65,929,571
30. Audited accounts and wages payable	205,582,085	208,233,108
31. Miscellaneous accounts payable	53,713,666	53,074,319
32. Interest matured unpaid	370,962,889	279,935,599
33. Dividends matured unpaid	9,485,343	9,491,844
34. Funded debt matured unpaid	313,848,643	273,661,098
35. Unmatured dividends declared	14,483,078	14,483,124
36. Unmatured interest accrued	109,547,525	111,020,011
37. Unmatured rents accrued	33,540,595	32,692,819
38. Other current liabilities	17,441,997	17,096,351
39. Total current liabilities (items 28 to 38)	$1,539,456,895	$1,363,282,280
40. Tax liability (Account 771):		
40-01. U. S. Government taxes	$33,757,986	$35,022,718
40-02. Other than U. S. Government taxes	157,110,201	159,162,497

† August, 1935, income as reported was increased by credits to operating expenses on account of reversal of charges previously made for liability under Railroad Retirement Act. These credits for August, 1935, amounted to $419,495, and for the eight months ended with August, 1935, the net credit is $6,967,423.

* Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within 6 months after close of month of report.

‡ Includes obligations which mature not more than 2 years after date of issue.

§ Deficit.

NET INCOME OF LARGE STEAM RAILWAYS WITH ANNUAL OPERATING REVENUES ABOVE $25,000,000

Name of Railway	Net income after depreciation and retirements, For the eight months of 1935	Net income after depreciation and retirements, For the eight months of 1934	Net income before depreciation and retirements, For the eight months of 1935	Net income before depreciation and retirements, For the eight months of 1934
Alton R. R.	*$1,885,973	*$1,002,690	*$1,669,286	* $886,539
Atchison, Topeka & Santa Fe Ry. System†	3,467,331	4,377,958	11,036,593	12,046,241
Atlantic Coast Line R. R.	* 1,171,889	687,043	347,360	2,075,287
Baltimore & Ohio R. R.	* 3,440,671	* 2,573,211	1,237,517	2,532,211
Boston & Maine R. R.	* 462,726	* 837,269	639,047	234,163
Central of Georgia Ry.	* 1,831,361	* 1,823,657	* 1,284,029	* 1,299,216
Central R. R. of New Jersey	* 1,173,403	* 787,002	* 53,758	608,859
Chesapeake & Ohio Ry.	17,701,259	18,110,010	23,217,478	22,791,973
Chicago & Eastern Illinois Ry.	* 1,263,949	* 1,177,519	* 857,903	* 891,464
Chicago & North Western Ry.	* 9,482,242	* 6,342,258	* 6,040,918	* 3,316,469
Chicago, Burlington & Quincy R. R.	* 3,068,821	1,568,188	62,873	3,696,001
Chicago Great Western R. R.	* 1,120,513	* 540,765	* 773,454	* 204,335
Chicago, Milwaukee, St. Paul & Pacific R. R.	*15,264,538	*11,233,919	*11,508,050	* 6,625,233
Chicago, Rock Island & Pacific Ry.	*10,892,493	* 8,071,311	* 7,884,542	* 4,940,562
Chicago, St. Paul, Minneapolis & Omaha Ry.	* 2,013,888	* 1,126,267	* 1,592,006	* 752,487
Delaware & Hudson R. R.	* 1,966,331	* 2,019,772	* 1,267,781	* 1,288,276
Delaware, Lackawanna & Western R. R.	* 2,799,730	* 1,025,411	* 929,388	684,096
Denver & Rio Grande Western R. R.	* 3,507,369	* 2,223,936	* 2,710,399	* 1,541,859
Elgin, Joliet & Eastern Ry.	892,721	* 453,310	1,491,046	161,357
Erie R. R. (including Chicago & Erie R. R.)	* 1,841,948	244,971	900,036	3,304,120
Grand Trunk Western R. R.	* 515,396	* 698,593	201,358	* 78,152
Great Northern Ry.	* 1,707,938	* 4,627,132	567,267	* 2,242,152
Illinois Central R. R.	* 3,911,393	* 856,131	687,104	3,616,253
Lehigh Valley R. R.	* 1,958,307	* 1,628,538	* 332,704	* 310,916
Long Island R. R.	* 714,879	96,711	14,012	753,771
Los Angeles & Salt Lake R. R.	2,493	347,909	494,251	850,664
Louisville & Nashville R. R.	1,854,660	1,820,673	4,700,560	4,592,046
Minneapolis, St. Paul & Sault Ste. Marie Ry.	* 4,397,823	* 3,913,497	* 3,640,324	* 2,944,177
Missouri-Kansas-Texas Lines	* 3,103,633	* 1,760,960	* 2,238,319	* 1,113,495
Missouri Pacific R. R.	*11,349,987	* 8,543,679	* 8,442,297	* 5,355,322
New York Central R. R.‡	* 6,662,976	* 3,695,927	4,435,560	6,516,235
New York, Chicago & St. Louis R. R.	* 267,135	321,528	830,586	1,230,433
New York, New Haven & Hartford R. R.	* 2,293,970	* 2,974,146	12,368	* 294,120
Norfolk & Western Ry.	13,933,839	13,427,386	16,681,333	16,718,739
Northern Pacific Ry.	* 7,409,086	* 2,476,286	* 5,228,849	* 539,701
Oregon Short Line R. R.	198,388	66,133	858,667	813,626
Oregon-Washington R. R. & Navigation Co.	* 2,240,340	* 2,045,954	* 1,851,122	* 1,613,318
Pennsylvania R. R.	11,660,944	13,575,477	25,557,290	27,452,773
Pere Marquette Ry.	238,475	295,456	1,960,563	1,794,416
Pittsburgh & Lake Erie R. R.	2,052,394	1,968,516	3,268,509	3,526,078
Reading Co.	2,743,335	4,089,632	4,794,324	6,185,888
St. Louis-San Francisco Ry.	* 7,819,447	* 5,788,476	* 5,737,930	* 3,704,888
St. Louis Southwestern Lines	* 540,100	* 684,570	* 124,013	* 342,149
Seaboard Air Line Ry.	* 4,959,456	* 4,955,308	* 3,710,686	* 3,787,628
Southern Ry.	* 2,222,307	* 2,590,159	* 1,247,430	* 526,146
Southern Pacific Transportation System§	* 2,639,742	* 1,534,280	2,417,802	3,614,910
Texas & Pacific Ry.	355,380	466,585	1,161,560	1,267,917
Union Pacific R. R.	7,693,692	11,472,735	10,379,414	14,478,954
Wabash Ry.	* 2,307,501	* 2,110,588	* 855,573	* 927,195
Yazoo & Mississippi Valley R. R.	* 1,289,965	* 1,691,058	* 930,303	* 1,325,600

† Includes Atchison, Topeka & Santa Fe Ry., Gulf, Colorado & Santa Fe Ry., and Panhandle & Santa Fe Ry.
‡ Includes Boston & Albany, Michigan Central, and Big Four Lines, lessors to New York Central R. R.
§ Includes Southern Pacific Company and Texas & New Orleans R. R.
* Deficit.

month of August the net deficit was $2,267,174, as compared with $2,827,109 in August, 1934. For the eight months there was a decrease of nearly $40,000,000 in net railway operating income and, while fixed charges showed some reduction, there was also a decrease of $12,000,000 in other income. Only 13 of the large roads, with annual operating revenues above $25,000,000, showed a net income for the eight months after deduction of fixed charges and depreciation and retirements. The commission's summaries are given in the accompanying tables.

Heavy Traffic at Pennsylvania Station

The New York division of the Pennsylvania, the main line of which extends from New York to Philadelphia, 90 miles, is believed to be about the busiest railroad in the world. General Manager J. A. Appleton, commenting on the volume of traffic over the division and at the New York Terminal, states that on each week day, in the 60 minutes between 8 a.m. and 9, seventy-eight trains enter or leave the New York station, an average of one train movement every 46 seconds. And, during that same hour, 44 regular trains, chiefly through express, may be seen moving over the New York division, in the direction of New York. The Pennsylvania station is used by hundreds of trains of the Long Island, as well as by many of the Lehigh Valley and the New York, New Haven & Hartford.

The through trains of the Pennsylvania are now so numerous that the former custom of leaving the rush hours, morning and evening, free for the exclusive use of suburban trains has had to be modified, and through trains now arrive and depart in those crowded hours. Referring to the 44 passenger trains moving on the New York division between 8 and 9 in the morning, Mr. Appleton's statement says that many of these trains follow one another so closely that the only time interval is that imposed by the automatic block signals.

Regulation of Railroad-Owned Mines

Extension of the regulatory powers of the National Bituminous Coal Commission and of the Bituminous Coal Code to "captive" mines owned by railroads for the purpose of providing part of their coal supply was indicated in a statement issued by the coal commission at Washington on October 29. The statement said that careful study was being made of the provisions of the coal conservation act of 1935 and more particularly of Section 14 of the act which deals with the subject of coal purchases made by departments or agencies of the United States government and also with contracts made by such departments and agencies with contractors for "any public work or service." It added that in the opinion of counsel for the commission "this section of the act is mandatory and gives effect to a policy that purchases of bituminous coal in the cases above-mentioned shall be made only from producers who are members of the bituminous coal code" and that "the effect of this section appears to be far-reaching and will apply to railroads serving the government in the transportation of mails as well as firms and individuals contracting with the government for the supplying of materials." At hearings on the Guffey bill the railroads had opposed the measure on the ground that it would subject their mines, which are in the nature of plant facilities, to regulation by an industry-controlled organization.

Steam Railway Accident Statistics July, 1935

The Interstate Commerce Commission's completed statistics of steam railway accidents for the month of July, now in preparation for the printer, will show:

Item	Month of July 1935	Month of July 1934	7 months ended with July 1935	7 months ended with July 1934
Number of train accidents:				
Total	494	498	3,726	3,644
(At highway grade crossings, included in total)	15	8	98	75
Number of casualties in train, train-service and non-train accidents:				
Trespassers:				
Killed	328	355	1,532	1,527
Injured	368	408	1,800	1,854
Passengers on trains:				
Killed	3	3	12	15
Injured	167	148	1,122	970
Employees on duty:				
Killed	33	35	312	316
Injured	1,391	1,515	9,145	9,947
All other nontrespassers:*				
Killed	139	133	917	901
Injured	413	495	3,643	3,614
Total — All classes of persons:				
Killed	503	526	2,773	2,759
Injured	2,339	2,566	15,710	16,385

* Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties *for all classes of persons, including both trespassers and nontrespassers,* were as follows:

Killed	123	121	853	827
Injured	284	290	2,449	2,313

National Railway Appliance Association

At a meeting of the board of directors of the National Railway Appliances Association, Chicago, on October 25 following the death of C. W. Kelly, secretary-treasurer, C. H. White, district sales manager of the Industrial Brownhoist Corporation, with headquarters at Chicago, and vice-president of the association, was elected secretary and director of exhibits; and W. Homer Hartz, president-treasurer of the Morden Frog & Crossing Works, with headquarters at Chicago, and honorary director of the association, was also elected

treasurer. T. O'Leary, Jr., sales manager of the transportation department, western division, Johns-Manville Sales Corporation, with headquarters at Chicago, continues as president.

The headquarters of the association on November 1 were moved from the Standard Oil building to Room 1826, 208 South LaSalle street, where the offices will be open daily throughout the year for the convenience of the membership. In conjunction with the new offices, facilities also have been arranged for board and membership meetings.

Plans for the March exhibits are well under way and reservations for space thus far, being larger than at any time during the last 10 years, indicate that the coming exhibit will equal if not exceed those of previous years. Close contact has been established with the American Railway Engineering Association, a committee having been appointed to work with the president of the engineering association. An exhibit committee of five members has been appointed by the directors of the Railway Appliances Association to work with Mr. White.

I. C. C. Announces District Headquarters for Motor Carrier Regulation

The Interstate Commerce Commission has decided that its field forces for the administration of the motor carrier act will have the following headquarters, provided suitable arrangements can be made for necessary office space:

District Directors: Little Rock, Ark.; San Francisco, Calif.; Denver, Colo.; Atlanta, Ga.; Chicago, Ill.; Kansas City, Mo.; Boston, Mass.; Minneapolis, Minn.; New York, N. Y.; Charlotte, N. C.; Portland, Ore.; Philadelphia and Pittsburgh, Pa.; Nashville, Tenn.; Fort Worth, Tex., and Salt Lake City, Utah.

District Supervisors: Montgomery, Ala.; Phoenix, Ariz.; Little Rock, Ark.; Sacramento, San Francisco and Los Angeles, Calif.; Denver, Colo.; Hartford, Conn.; Dover, Del.; Jacksonville, Tallahassee and Tampa, Fla.; Atlanta, Ga.; Boise, Idaho; Chicago and Springfield, Ill.; Fort Wayne and Indianapolis, Ind.; Des Moines, Ia.; Kansas City, Mo.; Topeka, Kan.; Louisville and Frankfort, Ky.; Baton Rouge and New Orleans, La.; Augusta and Portland, Me.; Baltimore, Md.; Boston, Mass.; Detroit and Lansing, Mich.; Minneapolis, Minn.; Jackson, Miss.; St. Louis and Jefferson City, Mo.; Helena, Mont.; Lincoln, Neb.; Carson City, Nev.; Concord, N. H.; Trenton, N. J.; Santa Fe, N. M.; Albany, Buffalo and New York, N. Y.; Charlotte and Raleigh, N. C.; Bismarck, N. D.; Columbus, Cincinnati and Toledo, Ohio; Oklahoma City, Okla.; Portland and Salem, Ore.; Harrisburg, Pittsburgh and Philadelphia, Pa.; Providence, R. I.; Columbia, S. C.; Pierre, S. D.; Memphis and Nashville, Tenn.; Austin, Houston and Fort Worth, Tex.; Salt Lake City, Utah; Montpelier, Vt.; Richmond and Norfolk, Va.; Seattle, Olympia and Spokane, Wash.; Charleston, W. Va.; Madison and Milwaukee, Wis.; Cheyenne, Wyo., and Washington, D. C.

The above arrangement is subject to change if experience demonstrates that other locations would promote greater efficiency and economy of administration.

District directors and district supervisors will be appointed as a result of competitive civil service examinations. These examinations will be announced at an early date.

Grade Crossing Projects in 35 States Approved

One hundred and eighty-seven grade crossing projects to the amount of $14,013,050 in 35 states, to be financed from the $200,000,000 allocated for the purpose under the emergency relief appropriation act, had been approved by October 26, according to the weekly report of the status of the grade crossing work compiled by the Bureau of Public Roads, and 74 contracts had been awarded to the amount of $4,278,666; 41 of these projects are under construction. Of these, contracts to the amount of $802,489 were awarded during the week. The status of the work is shown in the accompanying table.

Status of U. S. Works Program Grade Crossing Projects

For the Week Ending October 26, 1935

State	Plans approved to date	Contracts awarded During week	Contracts awarded to date
Alabama	$1,359,000	$57,436	$689,368
Arizona	50,000		
Arkansas	384,000		98,000
California	642,000		
Colorado	236,000	190,000	190,000
Connecticut			
Delaware			
District of Columbia			
Florida	380,000	169,459	225,713
Georgia			
Hawaii			
Idaho	134,000		52,000
Illinois	284,000		
Indiana	619,000		
Iowa	769,000	59,508	516,233
Kansas			
Kentucky	809,000		
Louisiana			
Maine	79,000		
Maryland			
Massachusetts	256,000		
Michigan	1,609,050		1,111,249
Minnesota	35,000		
Mississippi			
Missouri	140,000		
Montana	695,000		176,000
Nebraska	496,000	326,086	326,086
Nevada	342,000		49,834
New Hampshire			
New Jersey			
New Mexico	143,000		41,000
New York	678,000		
North Carolina	424,000		
North Dakota	50,000		39,400
Ohio			
Oklahoma	615,000		310,000
Oregon	307,000		33,000
Pennsylvania	43,000		
Rhode Island			
South Carolina	408,000		129,360
South Dakota	144,000		
Tennessee	83,000		
Texas	165,000		59,000
Utah	162,000		26,000
Vermont	284,000		
Virginia			
Washington	702,000		41,000
West Virginia			
Wisconsin	427,000		116,000
Wyoming	60,000		49,423
Totals	$14,013,050	$802,489	$4,278,666

New P.R.R. Questionnaire to Patrons of Its Storedoor Service

For the second time since its collection and delivery service was established on December 1, 1933, the Pennsylvania is preparing to conduct a systematic inquiry among its patrons to ascertain how the usefulness of the service can be increased. For this purpose question blanks will in the next few weeks be distributed to patrons by the local agents of the railroad throughout the system.

Among other questions, patrons will be asked to state what hours are most convenient to them for both collection and delivery, their needs as to time in transit, their experience as to the dependability of the service, whether they are shipping by other means of transportation because of lower charges, and whether a reduced scale of l.c.l. rates for quantities larger than 100 lb. but below the carload minimums would attract their traffic.

Patrons will be urged to exercise complete freedom in making any other suggestions which in their opinion would improve the service or increase its efficiency for their purposes.

"The replies," says the P. R. R. announcement, "will be analyzed, tabulated, and carefully studied by the railroad's traffic department with a view to ascertaining what changes are desirable and practicable, in order to conform with substantial desires of the public and increase the availability of the service to patrons.

"Ever since its inauguration, the Pennsylvania's collection and delivery plan has been undergoing constant improvement and refinement. Many of the most important changes in it were the result of a large number of valuable suggestions received in reply to the previous inquiry into the desires and wishes of patrons, which was conducted early in 1934."

Meetings & Conventions

The following list gives names of secretaries, date of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—T. L. Burton, Room 3400 Empire State Bldg., New York, N. Y.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, 836 S. Michigan Ave., Chicago, Ill. To meet with Air Brake Association, Car Department Officers' Association, International Railroad Master Blacksmith's Association, International Railway Fuel Association, International Railway General Foreman's Association, Master Boiler Makers' Association and the Traveling Engineers' Association.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, F. T. R., M. & O. R. R., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 816 McCormick Bldg., Chicago, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York, N. Y.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, Union Station, St. Louis, Mo. Annual meeting, 1936, Chicago, Ill.

AMERICAN ASSOCIATION OF RAILWAY ADVERTISING AGENTS.—E. A. Abbott, Poole Bros., Inc., 85 W. Harrison St., Chicago, Ill. Annual meeting, January 17-18, 1936.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I. & L. Ry., 836 S. Federal St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, 319 N. Waller Ave., Chicago, Ill. Annual Meeting, 1936, Chicago, Ill. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY CAR INSTITUTE.—W. C. Tabbert, 19 Rector St., New York, N. Y.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—E. H. Gurton, Mgr., Land Settlement and Development, C. N. R., St. Paul, Minn. Next meeting, December 5-6, 1935, Chicago, Ill.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in co-operation with the Association of American Railroads, Division IV.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 10-12, 1936, Palmer House, Chicago, Ill.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—M. Fenaja, Missouri Pacific Lines Magazine, Missouri Pacific Lines Bldg., St. Louis, Mo.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIA-

Continued on next left-hand page

LOCOMOTIVES

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tion.—G. G. Macina, C. M. St. P. & P. R. R., 11402 Calumet Ave., Chicago, Ill.

American Short Line Railroad Association.—R. E. Schindler, Union Trust Bldg., Washington, D. C.

American Society of Mechanical Engineers.—C. E. Davies, 29 W. 39th St., New York, N. Y. Annual meeting, December 2-5, 1935. Railroad Division.—Marion B. Richardson, 192 E. Cedar St., Livingston, N. J. Annual meeting, December 3-4, 1935, 29 W. 39th St., New York, N. Y.

American Transit Association.—Guy C. Hecker, 292 Madison Ave., New York, N. Y.

American Wood Preservers' Association.—H. L. Dawson, 1427 Eye St., N. W., Washington, D. C. Annual meeting, January 28-30, 1936, Hotel Peabody, Memphis, Tenn.

Association of American Railroads.—H. J. Forster, Transportation Bldg., Washington, D. C.

Operations and Maintenance Department.—J. M. Symes, Vice-President, Transportation Bldg., Washington, D. C.

Division I.—Operating.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Freight Station Section.—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Protective Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Safety Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York, N. Y.

Division II.—Transportation.—G. W. Covert, 59 E. Van Buren St., Chicago, Ill.

Division IV.—Engineering.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 10-12, 1936, Palmer House, Chicago, Ill.

Construction and Maintenance Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 10-12, 1936, Palmer House, Chicago, Ill.

Electrical Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill.

Signal Section.—R. H. C. Balliet, 30 Vesey St., New York, N. Y.

Division V.—Mechanical.—V. R. Hawthorne, 59 E. Van Buren St., Chicago, Ill.

Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y.

Division VII.—Freight Claims.—Lewis Pilcher, 59 E. Van Buren St., Chicago, Ill.

Division VIII.—Motor Transport.—George M. Campbell, Transportation Bldg., Washington, D. C.

Car-Service Division.—C. A. Buch, Transportation Bldg., Washington, D. C.

Traffic Department.—A. F. Cleveland, Vice-President, Transportation Bldg., Washington, D. C.

Finance, Accounting, Taxation and Valuation Department.—E. H. Bunnell, Vice-President, Transportation Bldg., Washington, D. C.

Association of Railway Claim Agents.—F. L. Johnson, Chief Clerk and Claim Agent, General Claims Dept., Alton R. R., 340 W. Harrison St., Chicago, Ill. Annual meeting, June 17-19, 1936, Hotel St. Paul, St. Paul, Minn.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., 1519 Daily News Bldg., 400 W. Madison St., Chicago, Ill.

Bridge and Building Supply Men's Association.—W. S. Carlisle, National Lead Company, 900 W. 18th St., Chicago, Ill. Meets with American Railway Bridge and Building Association.

Canadian Railway Club.—C. R. Crook, 2271 Wilson Ave., N. D. G., Montreal, Que. Regular meetings, second Monday of each month, except June, July and August, Windsor Hotel, Montreal, Que.

Car Department Officers' Association.—A. S. Sternberg, M. C. B. Belt Ry. of Chicago, 7926 S. Morgan St., Chicago, Ill.

Car Foremen's Association of Chicago.—G. K. Oliver, 2514 W. 55th St., Chicago, Ill. Regular meetings, second Monday of each month, except June, July and August, La Salle Hotel, Chicago, Ill.

Car Foremen's Association of Los Angeles.—J. W. Krause, Room 299, 610 S. Main St., Los Angeles, Cal. Club not active at present.

Car Foremen's Association of St. Louis, Mo.—E. G. Bishop, Illinois Central R. R., East St. Louis, Ill.

Central Railway Club of Buffalo.—Mrs. M. D. Reed, 1817 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, second Thursday of each month, except June, July and August, Hotel Statler, Buffalo, N. Y.

Cincinnati Railway Club.—D. R. Boyd, 2920 Utopia Place, Hyde Park, Cincinnati, Ohio. Operation suspended indefinitely.

Cleveland Railway Club.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings temporarily suspended.

International Railroad Master Blacksmiths' Association.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.

International Railway Fuel Association.—T. D. Smith, 1660 Old Colony Bldg., Chicago, Ill.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn.

Master Boiler Makers' Association.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y.

National Association of Railroad and Utilities Commissioners.—Clyde S. Bailey, 810 18th St., N. W., Washington, D. C. Annual meeting, November 10-13, 1936, Atlantic City, N. J.

National Railway Appliances Association.—Suite 322, 910 S. Michigan Ave., Chicago, Ill. Exhibit at A. R. E. A. Convention, March 9-12, 1936, The Coliseum, Chicago, Ill.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, second Tuesday of each month, except June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

New York Railroad Club.—D. W. Pye, 30 Church St., New York, N. Y. Regular meetings, third Friday of each month, except June, July and August, 29 W. 39th St., New York, N. Y.

Pacific Railway Club.—William S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month, alternately at San Francisco and Oakland, excepting June at Los Angeles and October at Sacramento.

Railway Business Association.—P. H. Middleton (Treas. and Asst. Sec.), First National Bank Bldg., Chicago, Ill. Annual meeting, November 7, 1935, Hotel Stevens, Chicago, Ill.

Railway Club of Pittsburgh.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. Regular meetings, fourth Thursday of each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

Railway Electrical Supply Manufacturers' Association.—Edward Wray, 9 S. Clinton St., Chicago, Ill. Meets with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—P. A. Bissell, 40 Broad St., Boston, Mass.

Railway Supply Manufacturers' Association.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division, Purchases and Stores Division, and Motor Transport Division, Association of American Railroads.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. A. R., Division I.

Railway Tie Association.—I. C. Rowe, 2091 Railway Exchange Bldg., St. Louis, Mo.

Railway Treasury Officers' Association.—Merged with Association of American Railroads.

Roadmasters' and Maintenance of Way Association.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Annual meeting, September 16-18, 1936, Chicago, Ill.

Signal Appliance Association.—G. A. Nelson Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. A. R., Signal Section.

Society of Officers, United Associations of Railroad Veterans.—M. W. Jones, Baltimore & Ohio, Mt. Royal Station, Baltimore, Md. Annual meeting, October, 1936, Detroit, Mich.

Southern and Southwestern Railway Club.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

Southern Association of Car Service Officers.—R. G. Parks, A. B. & C. R. R., Atlanta, Ga.

Tool Foremen Suppliers' Association.—E. E. Caswell, Union Twist Drill Co., 11 S. Clinton St., Chicago, Ill. Meets with American Railway Tool Foremen's Association.

Toronto Railway Club.—R. H. Burgess, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, fourth Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

Track Supply Association.—D. J. Higgins, Gardner-Denver Company, 332 S. Michigan Ave., Chicago, Ill. Meets with Roadmasters' and Maintenance of Way Association.

Traveling Engineers' Association.—W. O. Thompson, 1177 E. 98th St., Cleveland, Ohio.

Western Railway Club.—C. L. Emerson, C. M. St. P. & P., Chicago, Ill. Regular meetings, third Monday of each month, except June, July, August and September, Hotel Sherman, Chicago, Ill.

Equipment and Supplies

LOCOMOTIVES

Chicago, Burlington & Quincy $3,000,000 Equipment Program

Directors of the Chicago, Burlington & Quincy aboard the Mark Twain on October 24, authorized a $3,000,000 equipment replacement program which provides for the construction of three 4-8-4 type freight locomotives at its West Burlington, Iowa, shops; 500 steel underframe box cars at its Havelock, Neb., shops; and 750 open top cars at its Galesburg, Ill., shops. The use of several types of alloy steel in the open top cars is being considered. Actual building of the equipment will start around the first of the year.

PASSENGER CARS

The Atchison, Topeka & Santa Fe has ordered two light-weight chair cars for experimental purposes and will try them out in regular service on the system. The cars will have a capacity for 65 persons. One car will be constructed of Cor-Ten steel by the St. Louis Car Company and the other will be built of stainless steel by the Budd Manufacturing Company.

FREIGHT CARS

Pennsylvania to Spend $30,000,000 for Freight Cars

The Pennsylvania intends shortly to build 10,000 freight cars of various types and to convert 1,000 additional cars which have become inactive in the service for which they were originally designed, into up-to-date freight-carrying equipment; the new and converted cars are expected to cost approximately $30,000,000.

Definite plans for the new equipment are now being worked out; announcement will be made later as to the types of cars to be built and places of construction. Part of the 10,000 new cars will be built in the company's shops at Altoona, Pa., at Pitcairn, and at Enola, providing many months of employment for the railroad's own shopmen. The remainder of the program probably will be constructed in outside plants.

With delivery of the new cars, all embodying modern features of design, the railroad will be in a position to scrap a large number of old cars of types not now in constant demand.

The Norfolk & Western has placed orders for the steel and other necessary materials for the 500 all-steel hopper cars of 57½ tons' capacity, to be built in its Roanoke, Va., shops, as reported in the *Railway Age* of September 28, page 416.

IRON AND STEEL

The Norfolk & Western has ordered 10,000 tons of 131-lb. rail—7,500 tons from the Carnegie-Illinois Steel Corporation,

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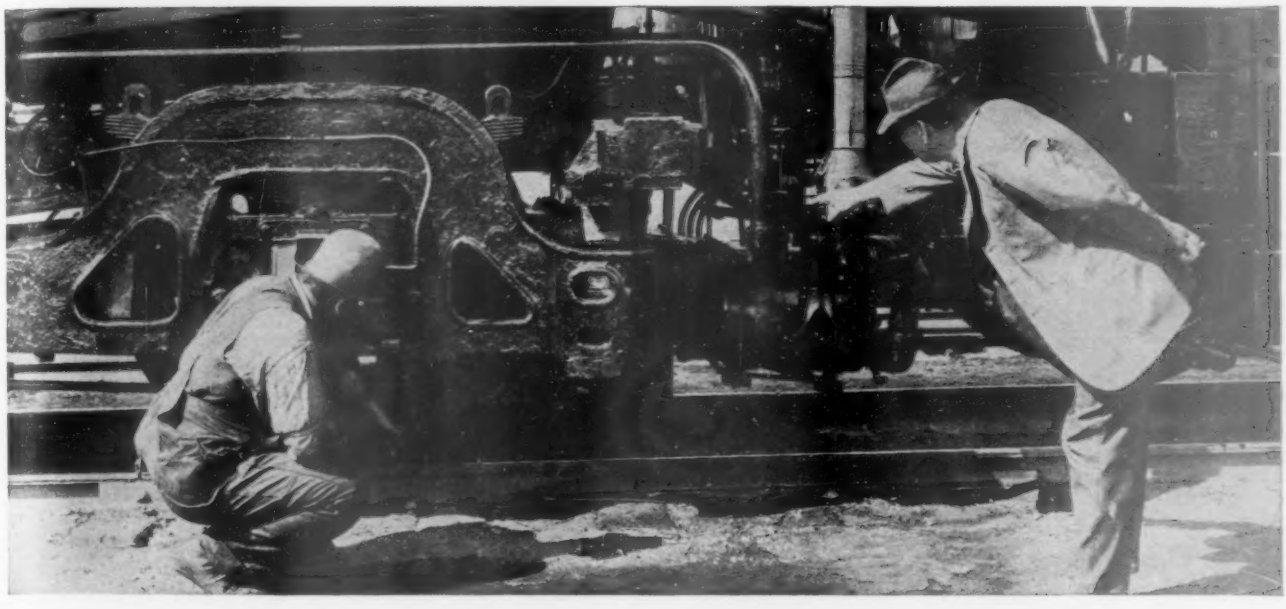
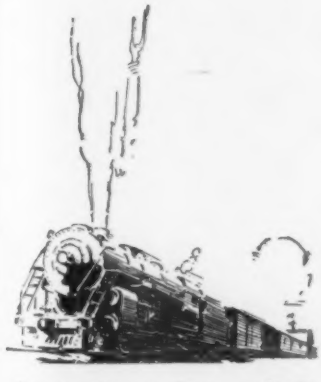
WITH THE BOOSTER

AN INTEGRAL PART OF THE LOCOMOTIVE

OPERATING COSTS ARE *Reduced*





Booster Repair Parts made by the jigs and fixtures that produced the original are your best guarantee of satisfactory performance.

Maximum economy for a given standard of operation requires a motive power unit that provides equalized power between the starting and operating speed ranges.

In such a unit the main cylinders develop only the power needed for maximum road speeds and the Locomotive Booster the extra power required for starting, accelerating and in "tight" places. This balanced design permits use of smaller main cylinders and correspondingly lighter weight of parts.

Smaller cylinders require less steam and less fuel. They impose lower stresses on rods and bearings and reduce maintenance costs.

FRANKLIN RAILWAY SUPPLY COMPANY, Inc.

NEW YORK CHICAGO MONTREAL

and 2,500 tons from the Bethlehem Steel Company.

THE WHEELING & LAKE ERIE has ordered 500 tons of rails from the Carnegie-Illinois Steel Corporation.

THE RICHMOND, FREDERICKSBURG & POTOMAC has ordered 1,500 tons of 131-lb. RE section rails which are now being rolled by the Bethlehem Steel Company.

MISCELLANEOUS

THE NEW YORK CENTRAL will receive bids at the office of W. C. Bower, vice-president in charge of purchases and stores, New York, until 12 o'clock noon, November 20, for air-conditioning equipment for seven passenger cars.

Supply Trade

T. Pierre Champion, vice-president of the **Champion Rivet Company,** Cleveland, Ohio, has been elected president to succeed his father, David J. Champion, who died on September 10.

Goodell & Hoppe, First National Bank building, St. Paul, Minn., have been appointed representatives of the Railroad Sales division in the Twin Cities territory for the **Cleveland Tractor Company,** Cleveland, Ohio.

J. H. Smith, manager of the Boston branch of the **West Disinfecting Company,** Chicago, has been appointed eastern representative in charge of railroad department sales, with headquarters at 51 Commercial Wharf, Boston, Mass., and 42-16 Barn Street, Long Island City, N. Y.

The Dearborn Chemical Company, Chicago, has purchased the **Electro-Chemical Engineering Corporation** from the **Pyle National Company,** and will operate it as a subsidiary company to market the Gunderson foam-meter and all other products of the Electro-Chemical Engineering Corporation, associated with the scientific treatment of boiler waters.

The Thwing Instrument Company, Philadelphia, Pa., makers of pyrometer apparatus, has changed its name to the **Thwing-Albert Instrument Company. Dr. Charles B. Thwing** is president and **Edward J. Albert,** whose name is now joined with Dr. Thwing's in the firm, has been associated with the company for the past 17 years as manager and secretary.

John F. Raps, who has been appointed vice-president of the **Okadee Company** and the **Viloco Railway Equipment Company,** with headquarters at Chicago, entered railway service as a special apprentice in June, 1900, with the Burlington, Cedar Rapids & Northern, now a part of the Chicago, Rock Island & Pacific. In July, 1904, he resigned to accept a position with the Toledo, St. Louis & Western at Frankfort, Ind., and in April, 1905, he entered the employ of the Illinois Central at Waterloo, Iowa. In April, 1909, he was promoted to general locomotive inspector,

Moffett Studio

John F. Raps

with headquarters at Chicago, and in July, 1930, resigned to become central manager of the Okadee Company and the Viloco Railway Equipment Company, which position he has held until his recent election.

L. O. Gunderson, vice-president of the **Electro Chemical Engineering Corporation,** Chicago, on October 15, became associated with the **Dearborn Chemical Company** as assistant to the vice-president and consulting chemical engineer. He was born on August 1, 1896, at Stoughton, Wis., and was educated at St. Olaf College, Northfield, Minn., and the University of Wisconsin, where he took graduate work in metallurgy, electro-chemistry, organic and industrial chemistry. He began his career in 1914 as a teacher in the public schools in Ridgeland, Wis., and during the war was attached to U. S. Naval Railway Battery No. 1 in France. In 1920, he became a chemist for Swift & Co. and in the same

Moffett Studio

L. O. Gunderson

year was appointed chemist and water inspector for the Wabash at Decatur, Ill. He held the latter position until 1922, when he became chief chemical engineer of the Alton at Bloomington, Ill., which position he held until 1928, when he became president of the Electro-Chemical Engineering Corporation, Chicago. He held the latter position until 1931, when the company was taken over by the Pyle-National Company and he was made vice-president.

OBITUARY

George H. Green, president of the National Waste Company, Chicago, died in that city on October 13 of heart failure. He was born in Chicago on December 19, 1886, and began his railroad career in the testing department of the Chicago, Rock Island & Pacific at Chicago, where he served 12 years as inspector and chief inspector. In 1914, he resigned to become railroad representative of the Garlock Packing Company. In 1916, he entered the employ of the National Waste Company as a representative and during the war served as a lieutenant from June, 1917, to June, 1919. In the latter year he returned to the National Waste Company as vice-president, which position he held until 1922, when he was elected president.

Matzene Studio

George H. Green

TRADE PUBLICATION

"EXIDE BATTERIES FOR RAILWAY SERVICE" is the title of a 24-page catalog, published by The Electric Storage Battery Company, Philadelphia, Pa. It describes service requirements of batteries in air conditioning, car lighting, signaling, engine starting, electric locomotives and industrial truck applications. The catalog also describes the characteristics and construction details of the various types of batteries manufactured by this company.

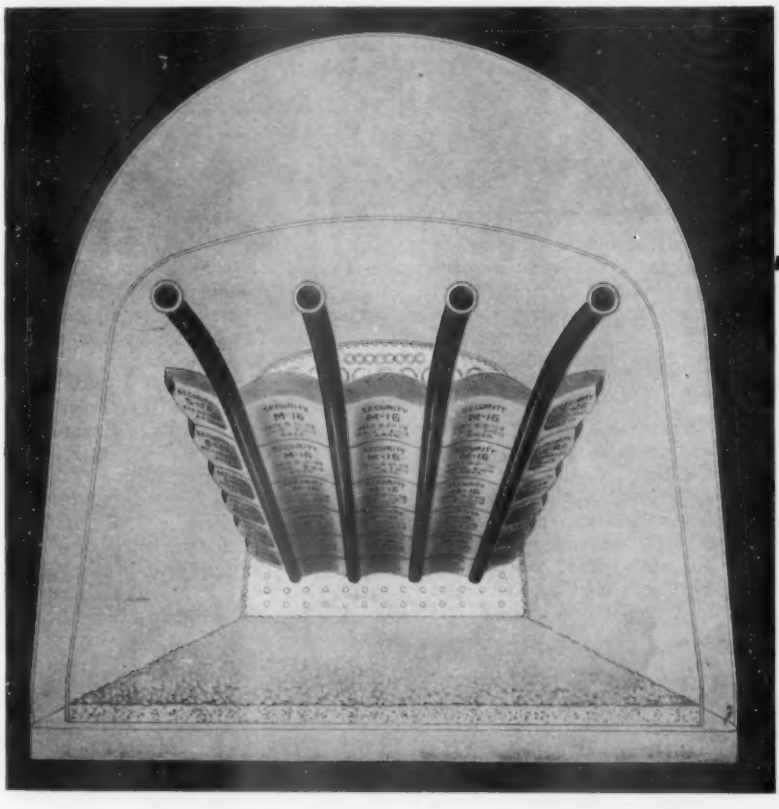
WELDING ELECTRODES.—A 30 page catalogue bearing the title "Welding Electrodes by Wilson" has been issued by Wilson Welding & Metals Co., Inc., North Bergen, N. J. The catalogue includes tables showing chemical analysis of electrodes, electrode numbers and applications, arc voltage, amperes recommended for various diameter electrodes, size and weight of electrodes and amount of deposited metal. The catalogue is featured by a number of large photographs showing difficult arc welding operations. These illustrations are supplemented by printed information explaining how the work is performed.

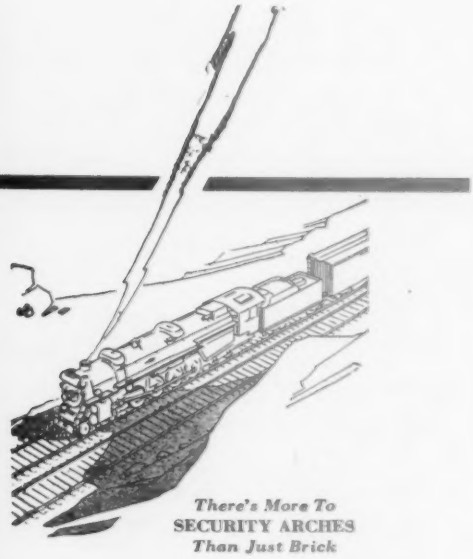
Continued on next left-hand page

THE MODERN BRICK ARCH

The modern brick arch has a lot more work to do than it had years ago. ● Locomotives are larger, schedules faster, trains heavier, and mileage piles up much quicker because of longer runs. ● Every part of the locomotive is worked more intensively, including the arch. ● Yet in spite of the increased severity of service Security Brick Arches cost less per 1,000 ton—miles and show a greater fuel saving than ever before. ● This is a tribute to the unceasing efforts of the American Arch Company in developing the locomotive arch. « « « « « «

does a lot of work





There's More To
SECURITY ARCHES
Than Just Brick

HARBISON-WALKER REFRACTORIES CO.
Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion Specialists » » »

Financial

ATLANTIC COAST LINE. — *Securities.* — The Interstate Commerce Commission has authorized this company to apply $1,200,000 of the proceeds of its recent sale of 10-year notes toward the payment of $1,500,000 of Charleston & Savannah 7 per cent first mortgage bonds which mature January 1.

CAMBRIA & INDIANA.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $1,300,000 of 3½ per cent first mortgage bonds to be sold at not less than face value and the proceeds used, together with funds in its treasury, to redeem $1,800,000 of outstanding bonds.

CHICAGO, BURLINGTON & QUINCY.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a portion of a branch line between Lewistown, Ill., and West Havana, 9.2 miles.

CHICAGO, ROCK ISLAND & PACIFIC.—*Abandonment.*—The trustees have applied to the Interstate Commerce Commission for authority to abandon the line of the Rock Island & Dardanelle, from Ola, Ark., to Dardanelle, 13.92 miles, and a line from Newton to Reasnor, Ia., 9.62 miles.

DELAWARE & HUDSON.—*Notes.*—The Interstate Commerce Commission has authorized the D. & H. R. R. Corporation to issue and reissue from time to time $18,500,000 of promissory notes bearing interest at not more than 4 per cent.

DELAWARE, LACKAWANNA & WESTERN. —*Trackage Rights.*—The Interstate Commerce Commission has authorized this company to operate under trackage rights over the Pennsylvania from Northumberland, Pa., to Sunbury, 1:9 miles.

DENVER & RIO GRANDE WESTERN.—*To File in Bankruptcy.*—The directors of this company, meeting in New York on October 30, announced their intention of filing a petition under Section 77 of the Bankruptcy Act as a step toward reorganization of the road's capital structure.

GREAT NORTHERN.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment of a line extending from Oroville, Wash., to a connection with the Vancouver, Victoria & Eastern on the international boundary at Chopaka, 20.71 miles.

LEHIGH VALLEY. — *Bonds.* — The Interstate Commerce Commission has authorized the Easton & Northern to extend for two years the maturity date of $300,000 of first mortgage 4½ per cent bonds due November 1, the L. V. being guarantor of the issue.

MISSOURI & ARKANSAS.—*Trackage Rights.*—The Interstate Commerce Commission has authorized this company to operate under trackage rights between Joplin, Mo., and Neosho, 19 miles. The M. & A. has also been authorized to operate over a line between Seligman, Mo., and Wayne, 9 miles, and over one-half mile of line and two miles of sidings of the Louisiana, New Orleans & Texas in Helena, Ark.

MISSOURI PACIFIC.—*Stedman Intervention Authorized.* — The Interstate Commerce Commission has authorized John W. Stedman and associates, representing certain holders of first and refunding mortgage bonds of this company, to intervene in the reorganization proceedings.

NEW YORK, NEW HAVEN & HARTFORD.—*Abandonment.*—The Interstate Commerce Commission has authorized the abandonment of a line from Pine Plains, N. Y., to Shekomeko, 5.1 miles.

TUCKERTON.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its entire line from Whitings, N. J., to Tuckerton, 28.9 miles.

Average Prices of Stocks and of Bonds

	Oct. 29	Last week	Last year
Average price of 20 representative railway stocks..	35.81	35.54	34.67
Average price of 20 representative railway bonds..	72.46	71.92	74.09

Dividends Declared

Albany & Vermont.—$1.25, payable November 15 to holders of record November 1.

Mine Hill & Schuylkill Haven.—$1.25, semi-annually, payable February 1 to holders of record January 15.

North Pennsylvania.—$1.00, quarterly, payable November 23 to holders of record November 18.

Reading Company.—1st Preferred, 50c, quarterly, payable December 12 to holders of record November 21.

Construction

CHICAGO, ROCK ISLAND & GULF.—The Interstate Commerce Commission has authorized the trustees of this company to construct a branch line extending from a connection with its lines 3 miles west of Sunray, Tex., southerly for a distance of 4 miles.

ERIE.—The New York Public Service Commission has approved as not excessive a bid of F. W. Smith & Co., Cleveland, Ohio, at $76,082, for the elimination of Nanticoke avenue and Liberty street crossings of this road, in the village of Endicott, N. Y., and has directed the railroad to award the necessary contract and begin the work as soon as possible.

FLORIDA EAST COAST.—This road has given a contract to the W. S. Lockman Construction Company, West Palm Beach, Florida, for the construction of car ferry transfer facilities at Port Everglades, Fla., to cost about $35,000.

PENNSYLVANIA.—The New Jersey Public Utility Commission has approved a plan for the elimination of Talmadge road grade crossing in the township of Raritan, N. J. This is to be accomplished by depressing the highway and carrying the four tracks of the railroad over the highway on a plate girder bridge. The estimated cost of the work is $148,000, exclusive of $15,000 for land to be acquired.

Railway Officers

OPERATING

L. Mayrisch, chief clerk in the operating department of the Coast division of the Southern Pacific, has been appointed supervisor of merchandise service, with headquarters as before at San Francisco, Cal.

Earl D. Conley, superintendent of transportation of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been appointed assistant to general manager, with jurisdiction over car service matters and incidental transportation affairs. The position of superintendent of transportation has been abolished.

J. J. Hayden, district manager, Car Service division, Association of American Railroads, the headquarters at Detroit, Mich., has been transferred in the same capacity to Minneapolis, Minn., succeeding **P. J. Coleman,** whose death on September 26 was noted in the *Railway Age* of October 5. **A. H. Gass** has been transferred to Detroit, Mich., succeeding Mr. Hayden and **L. M. Ross** has been appointed district manager, Car Service division, with headquarters at Boston, Mass., succeeding Mr. Gass.

H. T. Frushour, division superintendent of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed superintendent of the Long Island, with headquarters at Jamaica, N. Y., succeeding **J. C. White,** who has been promoted to general manager of the western region of the Pennsylvania, with headquarters at Chicago. A photograph and biographical sketch of the railway career of Mr. White was published in the *Railway Age* of April 6, in connection with his appointment as superintendent of the Long Island. **D. K. Chase,** superintendent of the Toledo division, has been appointed superintendent of the Eastern division at Pittsburgh. **C. F. Lingenfelter,** superintendent of the Columbus division, has become superintendent of the Toledo division. **J. T. Ridgely,** superintendent of the Indianapolis division, has become superintendent of the Columbus division. **W. W. Patchell,** superintendent on special duty, has become superintendent of the Indianapolis division.

Frank E. Lewis, manager of the dining car and hotel department of the Union Pacific System, with headquarters at Omaha, Neb., whose retirement, effective November 1, was noted in the *Railway Age* of October 26, entered railway service in 1887 as a clerk on the Baltimore & Ohio. Three years later he entered the service of the Pullman Company as a conductor, and in 1892 he became connected with the commissary department of that company, with headquarters at Council Bluffs, Iowa. Since that time Mr. Lewis has been associated continuously in various capacities with railroad commissaries. He first entered the service of the Union Pa-

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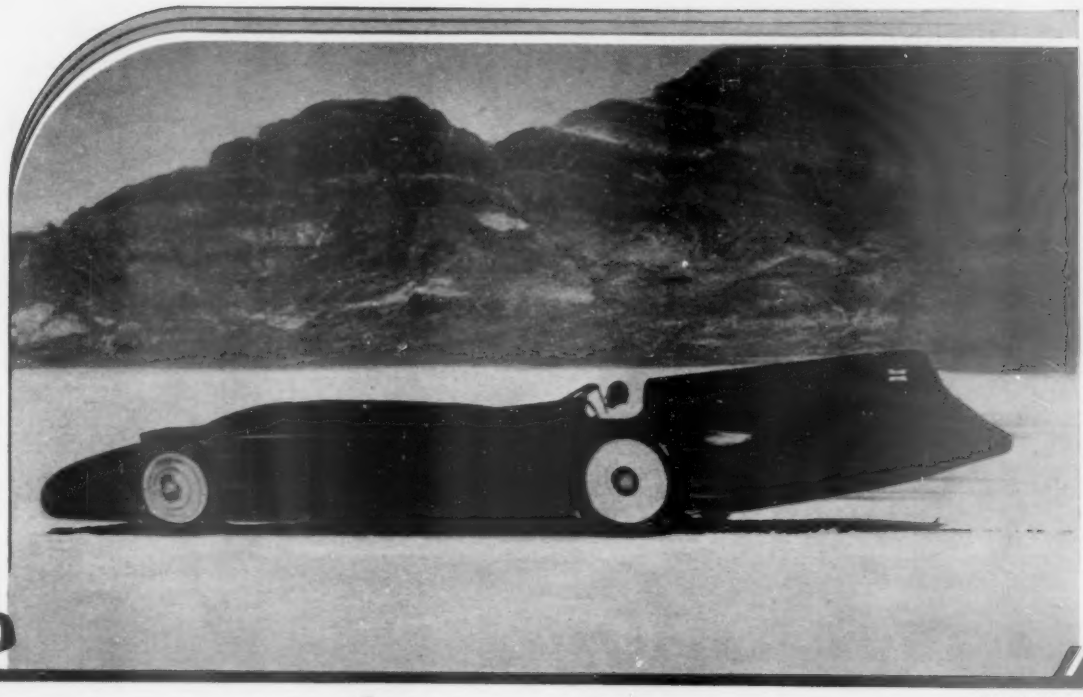

World Wide Photos

Specialization . . . . .

A blurred streak shot over the Bonneville Salt Flats at Utah on September 4, 1935, to set a new world's record of 301.337 miles per hour . . . the fastest speed ever attained by man on land. This phenomenal record was set by Sir Malcolm Campbell, British land speed ace, in his powerful Bluebird racing automobile. The new speed record was the result of a combination of a highly specialized automobile, the only one of its kind in the world, and a driver who knew how to get the utmost from his machine.

This situation is paralleled in another field . . . the locomotive steam superheater. The highly specialized equipment used in its manufacture, which is the only equipment of its kind in this country, represents the progressive development of locomotive superheater manufacture. All of these machines are operated by men skilled in their operation.

This specialized process is also available to you for the REmanufacture of your worn out superheater units. The cost is only about half that of new units. Avail yourself of this highly specialized service . . . it means economy, and operation of your REmanufactured superheater units from shopping to shopping without attention.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, INC.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

A-1018

Canada: The Superheater Company, Limited, Montreal

Exhaust Steam Injectors • *Superheater Pyrometers* • *Superheaters* • *Feed Water Heaters* • *American Throttles*

cific System in 1902, as superintendent of dining cars for the Oregon Short Line. He became manager of the dining car and hotel department of the system in 1915. Mr. Lewis has been active in the affairs of the American Association of Dining Car Superintendents, of which he was president in 1927-28. He is the author of a number of books of instruction pertaining to dining car operation.

Earle C. Webster, special representative of the executive vice-president of the Union Pacific System, whose appointment as manager of the dining car and hotel department of the system was noted in the *Railway Age* of October 26, has been connected with this railroad almost continuously since 1907. Prior to that year, Mr. Webster had served with the Adams Express Company and in the freight departments of two other railroads. He entered the service of the Union Pacific in the construction department of the shops at Omaha, Neb., later being transferred to the office of the auditor of disbursements. From 1908 to 1912 he served in the office of the division superintendent at Ogden, Utah, then returning to the office of the auditor of disbursements at Omaha. In 1925 Mr. Webster was transferred to the general manager's staff as a transportation inspector and in 1931 he was appointed a special representative of the vice-president.

Earle C. Webster

From July, 1933, to June, 1935, he was an executive officer and assistant executive secretary of the Western Railroad Regional Co-ordinating committee, with headquarters at Chicago, returning at the end of this period to the Union Pacific, as special representative to the executive vice-president.

F. H. Bagley, whose appointment as superintendent telegraph and signals of the Seaboard Air Line, with headquarters at Norfolk, Va., was noted in the *Railway Age* of October 5, was born on November 11, 1883, at Rahway, N. J. He received his education at Pratt Institute, Brooklyn, N. Y., and Purdue University, being graduated from the latter institution in June, 1907. His electrical engineering course at Purdue included a course in telephone engineering. Following his graduation, Mr. Bagley entered the apprenticeship course of the Union Switch & Signal Company, leaving before completing it to go with the Pennsylvania, on the New York division, where he conducted a school for signal maintainers and did special work in the signal supervisor's office. Later he returned to the Union Switch &

F. H. Bagley

Signal Company to engage in a-c. and d-c. development work. In July, 1912, he became signal inspector on the Louisville & Nashville, and in March, 1914, was appointed signal supervisor with headquarters at La Grange, Ky. In September of the same year he resigned to enter the service of the valuation department of the Interstate Commerce Commission, Southern district, as field signal engineer, with headquarters at Chattanooga, Tenn. In January, 1916, Mr. Bagley returned to the Louisville & Nashville as assistant signal engineer. In August, 1923, he became assistant signal engineer of the Chicago Union Station and was appointed signal engineer of the Seaboard Air Line on August 1, 1925, with headquarters at Norfolk, Va., which position he held until his recent promotion.

ENGINEERING AND SIGNALING

J. J. Desmond. division engineer on the Illinois Central at Chicago, who has been on a leave of absence because of ill health, has returned to his duties. **R. H. Carter,** who has been acting division engineer at Chicago during Mr. Desmond's absence, has returned to his former position of supervisor of track, with the same headquarters.

E. H. Flood, division engineer of the Eastern division of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed acting engineer of maintenance of way, Southern General division, with headquarters at Wilmington, Del., succeeding **R. T. Graham,** who has been given a leave of absence on account of ill health. **J. A. Schwab,** assistant division engineer of the Middle division, has become acting division engineer, Eastern division.

MECHANICAL

P. Baker, general foreman on the Belt Railway of Chicago, has been appointed master mechanic of this company and the Chicago & Western Indiana, with headquarters at Chicago.

SPECIAL

George O. Brophy, special representative, department of public relations, Union Pacific system, with headquarters at Omaha, Neb., retired on November 1.

OBITUARY

E. D. Comstock, who retired in 1931 as general passenger agent of the Bessemer & Lake Erie, with headquarters at Pittsburgh, Pa., died at Conneaut Lake, Pa., on October 24. Mr. Comstock was born on January 12, 1854, at Clarks Mills, N. Y., and entered railway service on September 1, 1881, as a clerk in the auditing department of the Pittsburgh, Shenango & Lake Erie (now part of the Bessemer & Lake Erie). In 1888 he was made a clerk in the passenger department and eight years later he was promoted to traveling passenger agent. From June, 1901, until his retirement Mr. Comstock held the position of general passenger agent, with headquarters at Pittsburgh.

Edward F. Knibloe, who retired in February, 1932, as general agent of the Buffalo Creek, died on October 5 at Buffalo, N. Y. Mr. Knibloe had been continuously identified with the Erie and its predecessor and affiliated companies for 59 years, having entered the service in November, 1872, and served successively as day telegraph operator, chief clerk, and train despatcher. In 1887 he was appointed superintendent of the western division of the New York, Lake Erie & Western, later being transferred to Elmira, N. Y., as superintendent of the Tioga division. He became general agent of the Buffalo Creek in January, 1892, which position he held until his retirement in his 82nd year.

C. C. Barnard, superintendent on the Union Pacific, with headquarters at Green River, Wyo., was shot and killed by a discharged employee on October 27, at Cheyenne, Wyo. Mr. Barnard was born on September 28, 1880, at Bloomington, Ill., and entered railway service in 1899 as a caller with the St. Joseph Terminal at St. Joseph, Mo., serving later as a clerk and operator. In 1909 Mr. Barnard entered the service of the St. Joseph & Grand Island (part of the Union Pacific System), serving as an operator, dispatcher, and chief dispatcher until 1913. In that year he was appointed a division examiner on the Nebraska division of the Union Pacific, being appointed trainmaster on the Colorado division in 1917. Two years later Mr. Barnard was transferred to the Wyoming division, and in 1920 he was promoted to assistant superintendent of the Western division, being appointed acting superintendent of the same division in 1921 and superintendent in the following year. Later, in 1922, he was transferred to the Colorado division, with headquarters at Denver, Colo. His transfer to Green River came in 1934.